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## THE PLACE OF HYDROSTATIC PRESSURE IN THE TREATMENT OF INTUSSUSCEPTION.[1]

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SINCE Hipsley first (1926) described his method of reducing infantile intussusception by the pressure of a column of saline solution, there have been few if any references in the literature to this method of treatment.

In an endeavour to assess the value of the method an analysis of 102 cases of my own is presented, in the great majority of which hydrostatic pressure has been the preliminary or only method of treatment.

The idea was not new, for Hirschsprung of Copenhagen in 1870 had used water enemas, and Clubbe of Sydney in all his early cases used an injection of warm oil, maintaining that "it always reduces the intussusception to a certain extent and in the best and gentlest possible way. In this way it lessens the shock of the coming operation because less manipulation of the intestines is needed. It is especially useful in cases in which we find the intussusception in the rectum; because if we do not use it we may find some difficulty in getting our fingers below the tumour to begin the squeezing process". But it was not until Hipsley published his first series of 100 cases with the amazingly low mortality rate of 5%, at a time when in most centres the mortality rate was between 20% and 30%, that attention was drawn to the importance of this method and to the results that could be achieved by its use combined with appropriate surgery. He first conceived the idea of using a fixed pressure—that of a column of fluid three feet above the level of the patient—and with this pressure he felt that there was no risk of rupturing the bowel. Those who are interested can read the details in his published articles, but the method may be summarized as follows. Under general anæsthesia an injection of saline solution is given through a number 15 catheter, which is passed into the bowel for about three inches and kept in place by a firm grasp on the buttocks around it. The fluid is in a container three feet above the bed, and will run rapidly in the early stages and more slowly as the intussusception is returned to its starting point. The pressure is maintained for two to three minutes, and then the fluid is allowed to return through the catheter, the large bowel thus being emptied. If the first injection is unsuccessful, a second may be given. The procedure is carried out in a room next to the operating theatre, and if it is unsuccessful, operation is undertaken immediately. The most important sign that the intussusception has been reduced is a uniform distension of the abdomen due to fluid in the small intestine.

The reviewer in "The Medical Annual" for 1928, in referring to Hipsley's first paper, made the following statement:

> The record of Hipsley's paper is an impressive one for the results he has obtained are lower than any operative results hitherto recorded. It would seem that we must readjust our impressions on non-surgical reduction. Most of us have never given this method a trial—we have accepted the tradition handed on from one to another that operative interference is the only reliable course to pursue; but in view of records such as those of Hipsley it would seem that the method is worthy of fuller consideration than it has previously received.

But has it received that fuller consideration which it undoubtedly warrants? In the Australian capital cities it is not by any means universally used, and in a recent visit to America I found that, although the method was well known, in some centres there was indifference to it, in others active antagonism, while in others again there was enthusiastic advocacy of the method of reduction by barium enema under fluoroscopic control which for

[1] Based on a paper read on October 15, 1948, at a meeting of the Section of Pædiatrics of the New South Wales Branch of the British Medical Association.

many years has been a popular method in the Scandinavian countries.

The reasons usually given for not employing the method are that it is impossible to be sure the intussusception has been reduced, that it produces unnecessary shock and delays the operation which may subsequently be necessary, and that a local starting point such as a polypus may be missed.

In reply to the first criticism, Hipsley has pointed out that in nearly every case the tumour will be reduced to the region of the caecum. If the tumour is completely reduced and the ileo-caecal sphincter is relaxed, fluid will continue to flow into the small intestine and will produce a uniform distension of the abdominal cavity, which is in pronounced contrast to the usually flat or scaphoid appearance of the abdomen when the patient is first examined. This distension may be taken as a certain sign of reduction. As an additional safeguard one teaspoonful of powdered charcoal is given by mouth as soon as the child has recovered from the anæsthetic, and it has been found that this will appear in the material returned from a bowel washout given six hours later.

In a proportion of cases, although the tumour is reduced, the ileo-caecal sphincter contracts and prevents the flow of saline into the small intestine. If in these cases the fluid is drained from the large intestine and the abdomen again palpated, an indefinite swelling may be felt in the right iliac fossa, and it will then be necessary to open the abdomen to confirm or complete the reduction. But this exploration can be carried out through a small laterally placed McBurney incision, which is a distinct advantage over the larger and more damaging right rectus incision.

With regard to shock, I believe that two important factors are involved. The first is the well known fact that the degree of shock produced by the disease itself varies greatly, and that whereas a "tight" enteric intussusception may be associated with profound shock from its inception, there are other types which are "loose" and proceed rapidly along the colon in a few hours without at any time producing much evidence of shock. The other factor is that during the manipulation a "satisfactory" plane of anæsthesia should be maintained—and by "satisfactory" is meant a degree of anæsthesia which produces relaxation of the abdominal wall that will not be altered by palpation. Unless the anæsthetist is aware of these requirements, he may think that a "light" anæsthetic is all that is required, and under such conditions shock will be produced. If, however, the anæsthetic is satisfactory, I have not been able to satisfy myself that shock is an additional risk.

With regard to delaying the operation, if this is necessary a distinction should be made between early and late intussusception—that is, between patients examined in the first twenty-four hours and those with a longer history. In the first group there is little difference in the time involved in giving the injection and confirming or completing the reduction by means of a gridiron incision, and that involved in opening the abdomen by a rectus incision, reducing the intussusception and closing the abdomen in layers. The second group has different problems, and in spite of the assistance given to the reduction by a preliminary injection in those cases "in which we find the intussusception in the rectum", I have not found the method to be a sufficient advantage to justify its routine use in the late cases. Here the question of adequate preparation by the restoration of fluid balance assumes a greater importance, and this should be carried out even if it means delaying the operation.

In this present series all the patients were aged under two years, and with the exception of one case in which the intussusception started in a Meckel's diverticulum, in no case in which operation was performed was a polypus or other tumour found as a starting point; thus the objection that these causes may be overlooked does not assume much importance in the group aged under two years.

The advantages claimed for the method are that in a proportion of cases—depending on the skill and experience of the surgeon—the intussusception will be reduced without operation, and that in the majority of those in which reduction is not effected the operation will be simpler and can be satisfactorily and rapidly performed through a small gridiron incision. This may not seem so important at the time; but there have been cases in which intestinal obstruction has occurred in later life owing to adhesion of the small intestine to the mid-line scar, and there is certainly less risk of this complication when a laterally placed incision is made.

### Examination of the Series.

From a study of the literature it is apparent that there has been a general lowering of mortality rates in all published series; but no significant series in which operation alone has been the method of treatment has been published comparable with Hipsley's. This may be a matter of individual skill rather than of the use of a particular method; but the fact remains that his results are better than the average results of the hospital where most of his patients were treated.

At the Royal Alexandra Hospital for Children there has been no significant alteration in the mortality rate over the last twenty years, and this warrants an examination and reconsideration of the methods employed.

Table I shows the mortality rates in periods which represent the nearest figure to 100 over the years 1929 to 1947. Prior to this the death rate was higher, as is shown by some figures published by Vickers.

TABLE I.

| Period. | Number of Cases. | Deaths. | Mortality Rate. (Percentage.) |
|---|---|---|---|
| 1912 to 1914 .. .. | — | — | 12·7 |
| 1915 to 1917 .. .. | — | — | 17·8 |
| 1918 to 1929 .. .. | — | — | 19·0 |
| 1929 to 1931 .. .. | 124 | 15 | 12·1 |
| 1932 to 1934 .. .. | 97 | 13 | 13·4 |
| 1935 to 1937 .. .. | 97 | 14 | 14·4 |
| 1938 to 1940 .. .. | 124 | 8 | 6·4 |
| 1941 to 1943 .. .. | 107 | 12 | 11·2 |
| 1944 to 1945 .. .. | 106 | 14 | 13·2 |
| 1946 to 1947 .. .. | 100 | 11 | 11·0 |
| Total 1929 to 1947 | 755 | 87 | 11·5 |

In the present series of 102 cases there were 10 deaths (9·8%), representing about the average of the figures at the Royal Alexandra Hospital for Children. It is realized that it is less difficult to lower a mortality rate of 20% in any given condition to 10% than it is to lower the rate from 10% to 5%, but the target figure of 5% should not be impossible of achievement. Any improvement will depend on two factors. The first is the stage of the disease at which the child is admitted to hospital for treatment, and the objective should be that the vast majority should be admitted within the first twenty-four hours. In the later cases improved methods of resuscitation and of operative procedure may lower the mortality rate; but the first factor will remain by far the most important.

#### *Time of Admission to Hospital.*

In the present series of 102 cases, 75 patients were admitted to hospital within the first twenty-four hours and 26 at a later period; one case was not recorded. This is a good record and a tribute to the high standard of general practice in this country. In a series published recently from Newcastle-upon-Tyne, in only 41% of recorded cases were the patients admitted to hospital in the first twenty-four hours, and Nordentoft in a series of 440 cases reported that 69·1% of patients were treated in the first twenty-four hours.

#### *Results.*

In the present 102 cases, in 21 the intussusception was reduced without operation, in 23 saline injection was given and reduction was confirmed at operation, and in 44 the attempt was unsuccessful and operative reduction was necessary. In 14 laparotomy was performed without preliminary injection. These results compare unfavourably

with Hipsley's figures in 1937 for 142 cases, in 60 of which the reduction was effected without operation (42·2%), in 30 of which it was reduced and confirmed at operation (21·1%), and in 52 of which the method was unsuccessful and operation was needed (36·6%). They compare even less favourably with the results achieved by reduction with a barium enema. Nordentoft in 245 cases reduced the intussusception in 133 (54%) by the use of a barium enema, and Helmer in 79 cases reduced the intussusception in 62 (79%) by the use of a barium enema.

These results raise the question of whether the method of reduction by barium enema, which has recently been used by Ravitch, of Baltimore, should not receive more attention in this country.

*Onset.*

It is of interest to classify the presenting symptoms and to find which group gave most trouble in diagnosis.

1. The typical text-book picture of a baby screaming with pain, becoming pale and collapsed and later passing blood, was seen in 34 cases. In a further 18 cases the same symptoms occurred without the passage of blood, and of these 52 cases in 47 the diagnosis was made in the first twenty-four hours.

2. A less dramatic onset was seen in 20 cases. The baby had abdominal pain, and in many cases the mother described the child as "wriggling" in discomfort with recurrent attacks of pain; in nine passage of blood was noted. Of these 20 cases in 17 the diagnosis was made in the first twenty-four hours.

3. Although vomiting is mentioned as an important symptom in all descriptions of the disease, it may be misleading when it is the main symptom. This occurred in 16 cases, but in 15 of these blood was passed at some stage. The difficulty of diagnosis in these cases can be seen by the fact that only four of the children were admitted to hospital in the first twenty-four hours.

4. In six cases the main emphasis was placed on the symptoms of shock—the baby was pale and collapsed, drowsy and lethargic. Three patients in this group passed blood, but five were admitted to hospital in the first twenty-four hours in spite of the absence of a classical history.

5. Seven patients presented the symptoms of gastro-enteritis. These cases are notoriously difficult to recognize, especially as the intussusception may occur during the course of an attack of gastro-enteritis. Six patients passed blood in the stool, and only two were admitted to hospital in the first twenty-four hours.

One case was not recorded.

*Varieties.*

There is some variation in the nomenclature; but in this series all those cases in which the intussusception originated in the region of the terminal part of the ileum and the ileo-caecal valve are considered as "boundary" cases—and even with this classification an unduly large proportion originated in the small bowel.

Table II shows the details.

TABLE II.

| Site of Origin of Intussusception. | | Classification. |
|---|---|---|
| Small bowel .. .. .. | 16 | Enteric (29) |
| Small bowel double .. .. | 13 | |
| Ileo-colic .. .. .. .. | 23 | Boundary (49) |
| Ileo-colic double .. .. .. | 2 | |
| Ileo-caecal .. .. .. | 17 | |
| Caeco-colic .. .. .. | 6 | |
| Caeco-colic double .. .. | 1 | |
| Large bowel .. .. .. | 1 | |
| Unknown .. .. .. .. | 23 | |

*Presence of a Mass.*

The presence of a mass is usually regarded as the most important single sign; but in this series a definite mass was recorded in only 85 cases. An indefinite mass was found in five cases, but in seven it was noted that no mass was felt. All these patients had other signs sufficient to warrant the diagnosis. Nordentoft recorded a palpable mass in 81% of cases, and Morrison and Court in 85%.

*Blood.*

The presence of blood in the stool was noted in 80 cases. This should not be regarded as an early sign, and it is of interest that no blood was seen in the stool in 21 cases, and in 19 of these the first stool was normal to inspection. This is comparable with Morrison and Court's finding that blood was absent from the stool in 24% of cases and was passed only in the first twenty-four hours in 56% of cases.

*Vomiting.*

Vomiting occurred in 70 cases, and its importance as an outstanding symptom has been emphasized.

*Deaths.*

Of the ten patients who died, four were admitted to hospital within the first twenty-four hours. These all had saline injections. In one case the intussusception was reduced and the child passed charcoal in a later wash-out; but the intussusception recurred and the recurrence was not recognized in time. In the second case reduction was not effected by injection, and the intussusception was reduced at operation only with difficulty. This patient died later from staphylococcal pneumonia. The third patient died suddenly twenty-four hours after the operation of small bowel resection with lateral anastomosis. No autopsy was allowed, but the cause of death was thought to be a pulmonary embolus. The fourth patient died of shock within twenty-four hours of operation, at which an ileo-caecal intussusception was reduced without difficulty.

The remaining six patients were admitted to hospital at periods varying from thirty-two hours to three days, and in only two cases was reduction attempted by saline injection. One patient was moribund on admission to hospital. One intussusception was reduced without difficulty, but the patient died eight hours after operation. Two intussusceptions were reduced with difficulty, and in one of these cases the bowel was gangrenous and was treated by Mikulicz's procedure. The remaining two intussusceptions were irreducible; one was treated by a short-circuiting operation, the mass being left *in situ*, and the other by Mikulicz's procedure.

These late cases will always remain a difficult surgical problem, and it does not appear that a preliminary saline injection is of value in the majority of them. Improved results are more likely to follow adequate resuscitation.

## Summary.

An analysis of the treatment of 102 patients with intussusception is given, hydrostatic pressure being used as a preliminary to operation. In 20 cases the intussusception was reduced without operation, and in a further 23 cases it was found reduced at operation. The death rate of the series was 9·8%.

It is believed that the method is of definite value, and that conservative methods should be employed in the treatment of all patients examined in the first twenty-four hours. It is suggested also that the method of reduction of an intussusception by a barium enema under fluoroscopic control should receive further study in this country.

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# THE BLOCKING OF ANTIBODIES IN VIVO: PRELIMINARY INVESTIGATION.

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THE problems associated with the production of specific anti-antibodies are of considerable antiquity. As early as 1899 Bordet[1] demonstrated the formation of anti-hæmagglutinins which protected rabbit erythrocytes from the hæmolytic action of fowl's serum. Ehrlich and Morgenroth in 1901[2] claimed to have shown the formation of anti-antibodies, by means of which they were able to differentiate specifically between multiple groups of immune bodies in the one serum. In 1904, however, Bordet[3] demonstrated that the anti-hæmagglutinins which inhibited the hæmolytic action of the serum from a given species could be produced, not only by the injection into another species of this specific hæmolytic serum, but also by the injection of normal serum from the same species. This work was confirmed by Muir and Browning in 1906.[4] The question was further complicated by Friedberger and Moreschi in 1908,[5] who immunized a series of rabbits with goat serum hæmolytic for rabbit erythrocytes, and found that the serum of the animals thus immunized did not inhibit, but, contrary to expectation, accelerated the hæmolysis, in the presence of complement, of rabbit erythrocytes sensitized with the goat antibody. Similar results were obtained by Altman in 1912.[6]

The observations concerning antibodies to antibacterial immune bodies were of the same type. Pfeiffer and Friedberger in 1903[7] demonstrated the formation of anti-antibodies which inhibited the lysis of bacteria by anti-bacterial sera. Here again, however, the blocking anti-antibodies could be formed by immunization either with the anti-bacterial serum, or with normal serum from the same species. Kraus and Pribram in 1905[8] showed that horse serum with a high agglutinin titre for typhoid bacilli was inactivated in its anti-bacterial action by simple anti-horse rabbit serum; and Landsteiner and Prasek in 1911[9] showed that rabbit anti-goat serum inhibited the action of goat bacterial agglutinins.

These findings tended to show that the antibody complex was composed in large part of a globulin fraction which is quite indistinguishable antigenically from the normal globulin of the same species—a conclusion which would accord well with the bulk of recent studies on the nature of immune bodies.

The work of Ando and his associates[10] and of Marrack and Duff[11] affords still further experimental evidence in support of the view that different antibodies in the one species are all built about a common globulin fraction, and that it is this fraction which is responsible for the formation of anti-antibodies, when the serum of the species, whether it contains specific immune bodies or not, is injected into another species. The experiments of Treffers and Heidelberger[12] are fully in accordance with this concept. The only evidence which clearly shows a difference in antigenicity between the normal and the immune globulin is that of Northrop,[13] who showed that a crystalline diphtheria antitoxin, isolated after digestion of the original antitoxic complex by trypsin, differed antigenically from normal serum globulins of the same species (horse).

The problems which it is proposed to investigate here are the following: (i) whether specific anti-antibodies can inhibit the action of given antibodies *in vivo*, as the above studies show to be the case *in vitro;* (ii) whether anti-bodies to normal serum globulins from the same species can inhibit the action of the given antibodies *in vivo*; (iii) whether there is any clinically detectable difference, *in vivo*, between the action in this respect of the specific anti-antibody and that of the antibody to normal serum, as the above studies show not to be the case *in vitro*.

The system adopted for the study *in vivo* of the action of a given antibody was the production of experimental nephritis in rabbits by anti-rabbit kidney duck serum after the method of Masugi.[14] In this "nephrotoxic" nephritis, as shown by Masugi, Smadel *et alii*,[15] and by Arnott, Kellar and Matthew,[16] the antibodies present in the nephrotoxic serum are responsible for specific measurable organic damage, which varies in degree, within certain limits, as the amount of antibody present, and as the length of the period over which the kidney is exposed to the action of the antibody. Thus, if the action of the nephrotoxic antibody is inhibited by the presence of specific anti-antibody, or of antibody to normal serum from the same species, this inhibition will be reflected by an absence of the kidney lesion, or by a kidney lesion of less severity. The presence and, to a much lesser extent, the degree of organic damage in the kidney can be determined by an examination of the urine.

## Experimental Method.

The preparation of the nephrotoxic serum was carried out after the methods described by Masugi[14] and Smadel,[15] with certain modifications. In order to obtain a kidney tissue extract as free from blood as possible, a cannula was inserted into the thoracic aorta of the anæsthetized rabbit while the blood was still circulating. In this way it was possible to begin the perfusion of the kidney with sterile physiological saline before the blood commenced to clot in the kidney capillaries. It was found that this procedure resulted, after perfusion with sterile saline, in what appeared macroscopically to be a totally blood-free kidney. This result could not be achieved if, as described by Masugi, the rabbit was killed by being bled from the carotid artery before the perfusion of the kidneys was begun. A sterile saline extract of kidney tissue of approximately 30% concentration, was prepared by grinding the blood-free kidney in the saline with abrasive until a more or less uniform suspension was obtained. This suspension was then centrifuged, and the supernatant fluid was pipetted off. (After Smadel[15].)

Two ducks, *A* and *B*, were immunized with repeated intraperitoneal injections of the kidney extract. Each duck received sixteen injections of extract extending over a period of three months. The volume of extract administered at each injection varied from five to fifteen millilitres, both ducks, however, being injected simultaneously, and receiving an equal amount on all occasions. Eight days after the last injection the ducks were bled by cardiac puncture, and the serum was separated by the usual means. This serum was made up in sealed sterile ampoules, heated for half an hour at 56° C. in order to destroy, as far as possible, its primary toxicity, and then stored at refrigeration temperature. Normal duck blood was also collected and subjected to the same treatment, and the serum stored in the same way.

Nine rabbits were injected with varying doses of both normal and nephrotoxic duck serum in the following manner:

Rabbit I received four millilitres of nephrotoxic duck serum *A* by intracardiac injection. On the following day it received another three millilitres of the same serum by intraperitoneal injection, and on the following day again, two millilitres of the same serum, again by intraperitoneal injection.

Rabbit II received the same dosage of normal duck serum on three consecutive days as Rabbit I had received of nephrotoxic duck serum *A*. The doses were administered in the same manner.

Rabbit III received eight millilitres of nephrotoxic duck serum *B* by intracardiac injection. On the following day it received another five millilitres of the same serum by intraperitoneal injection.

Rabbit IV received the same dosage of normal duck serum on two consecutive days as Rabbit III had received of nephrotoxic duck serum *B*. The doses were administered in the same manner.

Rabbit V received six subcutaneous injections of 0·5 millilitre of nephrotoxic duck serum *A* at ten-day intervals. Six days after the last subcutaneous injection, it received eight millilitres of nephrotoxic duck serum *A* by intracardiac injection.

Rabbit VI received six subcutaneous injections of 0·5 millilitre of normal duck serum at ten-day intervals. Six days after the last subcutaneous injection, it received five millilitres of normal duck serum by intracardiac injection.

Rabbit VII received six subcutaneous injections of 0·5 millilitre of nephrotoxic duck serum *A* at ten-day intervals. Six days after the last subcutaneous injection, it received four millilitres of nephrotoxic duck serum *A* by means of two intraperitoneal injections, each of two millilitres, separated by a half-hourly interval. On the following day it received another three millilitres of the same serum by intraperitoneal injection, and on the following day again, two millilitres of the same serum, again by intraperitoneal injection. Thus, the dosage following the series of subcutaneous injections is, in this case, the same as that administered to Rabbit I.

Rabbit VIII received six subcutaneous injections of 0·5 millilitre of nephrotoxic duck serum *B* at ten-day intervals. Six days after the last subcutaneous injection, it received eight millilitres of nephrotoxic duck serum *B* by means of four intraperitoneal injections, each of two millilitres at half-hourly intervals. On the following day it received another five millilitres of the same serum by intraperitoneal injection. Thus, the dosage following the series of subcutaneous injections is, in this case, the same as that administered to Rabbit III.

Rabbit IX received six subcutaneous injections of 0·5 millilitre of normal duck serum at ten-day intervals. Six days after the last subcutaneous injection, it received eight millilitres of nephrotoxic duck serum *B* by means of four intraperitoneal injections, each of two millilitres at half-hourly intervals. On the following day it received another five millilitres of the same serum by intraperitoneal injection. Thus the dosage of nephrotoxic duck serum *B* following the series of subcutaneous injections of normal duck serum is, in this case, the same as that administered to Rabbits III and VIII.

After the administration of either normal or nephrotoxic duck serum, the urine of the rabbits injected was collected daily and subjected to routine examination. The concentration of albumin present was estimated by Aufrecht's method, and the centrifuged sediment was inspected microscopically. The urine of the test rabbits was likewise examined immediately prior to each injection or series of injections of the duck serum.

## Results.

The results were as follows.

### *Rabbit I.*

No abnormal constituents were detected in the urine prior to injection.

On the third day after the last injection of nephrotoxic serum, albumin appeared in the urine in significant amounts, reaching a maximum concentration on the fifth day of 0·15% (Aufrecht). Thereafter, there was a gradual diminution in the albuminuria, until, by the eleventh day after the last injection, it had completely disappeared.

Microscopic examination of the centrifuged sediment revealed neither casts nor erythrocytes in this case.

### *Rabbit II.*

No abnormal constituents were detected in the urine prior to injection.

Systematic examination of the urine daily for a period of twenty-one days following the last injection of normal serum failed to reveal any abnormal urinary constituents.

### *Rabbit III.*

No abnormal constituents were detected in the urine prior to injection.

On the fourth day after the last injection of nephrotoxic serum, albumin appeared in the urine in significant amounts, reaching a maximum concentration on the seventh day of 0·30% (Aufrecht). Thereafter, again, there was a gradual diminution in the albuminuria, until, by the fifteenth day after the last injection, it had completely disappeared.

Microscopic examination of the centrifuged sediment revealed a small number of erythrocytes when the albuminuria was at its height, occasional hyaline casts, and a very few granular casts.

It is indicated that the kidney lesion produced in this case by a larger dose of nephrotoxic serum is one of greater severity than that produced in Rabbit I.

### *Rabbit IV.*

No abnormal constituents were detected in the urine prior to injection.

Systematic examination of the urine daily for a period of twenty-one days following the last injection of normal serum failed to reveal any abnormal urinary constituents.

### *Rabbit V.*

No abnormal constituents were detected in the urine prior to injection, or during the period of immunization with 0·5 millilitre doses of nephrotoxic serum *A* at ten-day intervals.

The intracardiac injection of eight millilitres of nephrotoxic serum *A* six days after the last subcutaneous injection immediately elicited the typical signs of acute anaphylactic shock. The animal died within one minute of the injection. Post-mortem examination revealed the characteristic extreme dilatation of the right side of the heart.

### *Rabbit VI.*

No abnormal constituents were detected in the urine prior to injection, or during the period of immunization with 0·5 millilitre doses of normal serum at ten-day intervals.

Since the intracardiac injection of eight millilitres of serum resulted in fatal anaphylactic shock in Rabbit V, it was decided to attempt the injection of a smaller amount by the same method. Five millilitres of normal duck serum were administered. Again, however, the typical picture of shock was produced. In this case the animal did not die for some minutes, irregular gasping respiration continuing until a short time after cessation of the heart beat. The post-mortem findings were similar to those noted in Rabbit VI.

### *Rabbit VII.*

No abnormal constituents were detected in the urine prior to injection, or during the period of immunization with 0·5 millilitre doses of nephrotoxic serum *A* at ten-day intervals.

Since intracardiac injection of serum after the period of immunization resulted in fatal anaphylactic shock (Rabbits V and VI), this method of administration was abandoned. Instead, the serum was given by repeated small intraperitoneal injections as described above. This method was accompanied by no visible ill effects.

On the second day after the last injection of nephrotoxic serum albumin appeared in the urine in significant amounts, reaching a maximum concentration on the sixth day of 0·25% (Aufrecht). Thereafter, there was a gradual diminution in the albuminuria until, by the fourteenth day after the last injection, it had completely disappeared.

Microscopic examination of the centrifuged sediment revealed a small number of erythrocytes when the albuminuria was at its height, some hyaline casts and an occasional granular cast.

It is indicated that the kidney lesion produced in this case after previous immunization is one of greater severity than that produced by the same dosage of the same serum in Rabbit I.

### *Rabbit VIII.*

No abnormal constituents were detected in the urine prior to injection, or during the period of immunization with nephrotoxic serum *B* at ten-day intervals. Here again, in order to avoid shock, the injections of serum after the period of immunization were given intraperitoneally as described above. In this case also there were no visible ill effects.

On the third day after the last injection, albumin appeared in the urine in significant amounts, reaching a maximum concentration on the sixth day of 0·52%

(Aufrecht). Thereafter, again, there was a gradual diminution in the albuminuria until by the sixteenth day after the last injection it had completely disappeared.

Microscopic examination of the centrifuged deposit revealed numerous erythrocytes when the albuminuria was at its height, some hyaline casts, and an occasional granular cast.

It is indicated that the kidney lesion produced in this case after previous immunization is one of greater severity than that produced by the same dosage of the same serum in Rabbit III.

*Rabbit IX.*

No abnormal constituents were detected in the urine prior to injection, or during the period of immunization with normal serum at ten-day intervals. The injections of nephrotoxic serum *B* after the period of immunization were again given intraperitoneally as described above, again with no visible ill effects.

Systematic examination of the urine daily for a period of twenty-one days following the last injection of nephrotoxic serum failed to reveal any abnormal urinary constituents. It is clear that the same dosage of nephrotoxic serum *B* which produced a marked kidney lesion in Rabbit III and a still more severe lesion in Rabbit VIII, failed in Rabbit IX, after previous immunization with normal duck serum, to produce any measurable kidney lesion whatsoever.

The above findings are set out in Table I.

## Discussion.

The preliminary nature of these observations, and the small number of animals used, must, of course, be stressed. However, the following tentative interpretation of the results is offered: (i) That the repeated injection into a rabbit over a period of some seven weeks of small doses of nephrotoxic duck serum does not produce in the rabbit any immunity to the nephrotoxic effect of a subsequent large dose of the same serum; but, contrary to expectations, increases its susceptibility to this effect. (This result more or less parallels the in-vitro observations of Friedberger and Moreschi.[5]) (ii) That the repeated injection into a rabbit over the same period of small doses of normal duck serum does produce in the rabbit an immunity to the nephrotoxic effect of a subsequent large dose of nephrotoxic duck serum.

The reasons for the apparent difference in antigenicity between the normal and the nephrotoxic duck serum in this investigation are not at once obvious. In the case of immunization with normal duck serum, it is to be presumed that the antibodies formed in the rabbit's blood to normal duck serum globulins are able to combine *in vivo*, as might well be expected from the considerable in-vitro evidence reviewed above, not only with normal duck serum globulins, but also with specific immune bodies in the duck serum. Thus, the anti-rabbit kidney antibodies present in the nephrotoxic duck serum are no doubt inactivated after injection by rapid combination with the antibodies to normal duck serum globulins already present in the rabbit's blood. This inactivation would account for the fact that no measurable kidney lesion was produced under these conditions.

In the case of immunization with nephrotoxic duck serum, however, the problem is somewhat more complex. Two facts require elucidation: (i) the apparent failure of the globulins in the nephrotoxic duck serum to produce antibodies in the rabbit's blood; (ii) the increased susceptibility of the rabbit, after immunization, to the effects of the nephrotoxic serum.

To explain the failure of nephrotoxic serum globulins to produce antibodies, when the administration of normal serum globulins under the same conditions succeeded in producing such antibodies, it seems necessary to postulate some form of rapid inactivation or destruction of the nephrotoxic globulins, to which the normal globulins are not subject. However, the assumption that this failure to produce antibodies is simply due to rapid destruction of the injected nephrotoxic globulins, would, apart from the fact that there is no evidence whatever to support such an assumption, be invalidated by the fact that the susceptibility of the rabbit to these globulins after the period of immunization is much increased. The view which would seem most adequately to account for both these phenomena is that the small doses of nephrotoxic globulin combine rapidly on absorption with the living rabbit kidney tissue. In this way the free globulins of the nephrotoxic serum, which are presumably a modification of normal duck serum globulins, are withdrawn from the rabbit's circulation, and, as far as their antigenicity is concerned, inactivated. At the same time it is considered, despite the absence of albuminuria during the period of immunization, that the insult offered to the kidney tissue by repeated exposure to even small doses of the nephrotoxic serum either results in the production of a subclinical lesion, or more probably, directly sensitizes the kidney to the subsequent very much larger dose. Under these conditions, the large dose acts either upon already damaged kidney tissue, or upon kidney tissue which has been specifically sensitized; so that the lesion produced after the period of immunization is of greater severity than that which is produced by the same dose in normal rabbit kidney.

We believe that the results obtained from this investigation show the necessity of further study of the mechanisms involved in the inactivation of antibodies *in vivo*—not only because these problems are in themselves of considerable theoretical interest, but also because of their possible relevance to clinical conditions in which the presence of specific antibodies in the blood-stream is responsible for organic damage. Examples of such conditions might well be hæmolytic disease of the newborn as a result of anti-Rh antibodies, acute Bright's disease, or even rheumatic fever.

It is proposed to extend these investigations with larger groups of experimental animals, and also to study the efficacy of passive immunization under similar conditions.

## Summary.

In a series of nine rabbits to which nephrotoxic duck serum was administered in varying doses, it was found: (i) that the intraperitoneal injection of a large dose of the nephrotoxic serum, after a period of immunization with small subcutaneous doses of the same serum, produced in the rabbit kidney a lesion of greater severity than that produced by the same dose in normal rabbit kidney;

TABLE I.

| Rabbit. | Maximum Albumin *Per Centum*, (Aufrecht.) | Duration of Albuminuria. | Red Cells. | Casts. | |
|---|---|---|---|---|---|
| | | | | Hyaline. | Granular. |
| Rabbit I (unimmunized), 4 ml., 3 ml. and 2 ml. of nephrotoxic serum *A*. | 0·15 | 8 days. | − | − | − |
| Rabbit VII (immunized with nephrotoxic serum *A*), 4 ml., 3 ml. and 2 ml. of nephrotoxic serum *A*. | 0·25 | 12 days. | + | + | ± |
| Rabbit III (unimmunized), 8 ml. and 5 ml. of nephrotoxic serum *B*. | 0·30 | 11 days. | + | + | ± |
| Rabbit VIII (immunized with nephrotoxic serum *B*), 8 ml. and 5 ml. of nephrotoxic serum *B*. | 0·52 | 13 days. | ++ | ++ | + |
| Rabbit IX (immunized with normal duck serum), 8 ml. and 5 ml. of nephrotoxic serum *B*. | — | — | — | — | — |

(ii) that the intraperitoneal injection of the same dose of nephrotoxic serum, after a similar period of immunization with normal duck serum, produced no measurable organic damage in the kidney.

It is believed that repeated subcutaneous injections of normal duck serum produce in the rabbit's blood antibodies to normal duck serum globulins, and that these antibodies are able to combine with, and hence inactivate, the specific anti-rabbit kidney globulins present in nephrotoxic duck serum. In the case of repeated injections of nephrotoxic serum, however, it is suggested that the specific anti-kidney globulins combine rapidly on absorption with the living kidney tissue, thus being withdrawn from the circulation before they are able to offer adequate stimulus to antibody formation, at the same time rendering the kidney tissue more susceptible to a subsequent large dose of the same serum.

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## EN AVANT, MES BRAVES![1]


By F. KINGSLEY NORRIS, C.B.E., D.S.O., E.D., K.H.P., E.D.,

*President of the Victorian Branch of the British Medical Association.*


YESTERDAY the Chancellor, Sir Charles Lowe, from the vast quarry of his wisdom addressed you as graduates of our university; today it is my privilege as President of the Victorian Branch of the British Medical Association to congratulate you and to welcome you to our profession.

Because of your registration an hour ago you now possess for the first time in your lives certain legal rights and privileges which, provided your conduct is worthy, will remain with you as long as you live. These rights, these privileges, are easily expressed in black and white, but each of them demands of you certain equally real responsibilities. You can now call yourselves doctor in your practice of medicine, now you can sign a certificate and a prescription as a registered medical practitioner, and each of you can, if you so desire, sue for your fee in a court of law.

You will soon be aware—if you have not already realized it—that in these enlightened times you may not legally mend your electric light fuse or attend to your domestic plumbing without a special licence, but it is lawful for anyone to practise medicine—whatever his qualifications—provided he does not claim to be nor call himself a doctor. But you can now call yourselves doctors and by so doing demonstrate to the public that you are qualified.

I do not know the motive that impelled any of you to study medicine—a family tradition, a sense of service to humanity, a seeking for financial security or advancement or merely because of indifference—but I can assure you that the opportunity is now before you to fulfil each or every one of these objectives. I do not know of any other calling or profession so truly rich in such opportunities. But these opportunities impose upon you very great responsibilities.

It is doubtful if, during you medical course, you have been fully aware of your responsibilities to your patients. Possibly not unless or until each of you has the misfortune to be seriously ill yourself will you fully realize these. A soldier far from battle may be trained to a high standard of efficiency, but only when someone shoots at him will he finally have the opportunity to learn his lessons.

Always remember that every patient comes to you for help. However exaggerated by the patient this need may be, however verbose or tiresome the expression of the need may be, the patient comes to you for help. There is little occasion for the expression of emotion by a doctor, but there is an essential place for sympathy. Perhaps you have been taught to consider disease rather than to consider the patient, to approach your lectures and clinical studies with a view to passing examinations rather than to helping someone in need.

If you ever have the misfortune to be seriously ill you will want to know the answers to three questions in rapidly diminishing order of importance. Firstly, are you going to recover? If this is answered in the affirmative a huge load rolls from your shoulders. Even if you are not to recover—any certainty is better than uncertainty. Hamilton Russell once told his students: "There is only one thing worse than having cancer: that is, thinking you have it." Once you know you are to recover you probably want to know how long before you will be fit

[1] An address to medical graduands.

again. The tremendous importance of this question, especially to a bread-winner, is not always realized by the doctor.

Having learnt the reasonable answer to these two questions, as an afterthought you may or may not want to know what is the matter with you; but, after the first two answers, this last question is really of little importance to the patient and just a matter of interest.

I doubt whether you have thought in this sequence, but if you earnestly consider each patient as yourself, your mother or your father, your wife or your child and act honestly from this approach, while of course you will make mistakes, as we all do, you will be honest with your patient and with your conscience and you will be truly helpful, which is your mandate.

In your endeavour to help your patient it is incumbent on you to maintain yourself abreast of sound advances in medicine, but be critical and wary in your acceptance and trial of any prematurely published or advocated therapeutic stunt. Never be reluctant to seek help. Do not confuse prestige with service. Your first duty is always to the patient and medical care should always travel first class.

The legal right to sign any certificate as a registered medical practitioner may seem trivial and unimportant, but, believe me, this is one of the heaviest responsibilities imposed upon you. A medical certificate is practically equivalent to an oath, a pledge of your name and of the reputation of your profession. Probably nothing has brought more disrepute to our profession than careless or false medical certification. Almost every day you will be called upon to sign some statement, the acceptance of which is usually to the benefit of an individual; but your duty is clear. You are not approached as a partisan, but as an expert; you are required to state a fact, not to advocate for the patient. Most incorrect medical certifications I believe to be the result of carelessness. The doctor thoughtlessly or from a misguided sense of kindliness to his patient certifies to facts of which he cannot possibly have any knowledge. "This man injured his thumb at work" is a false statement by a doctor unless he actually witnessed the accident. Of course, it is competent and correct for the doctor to certify as to the nature of the injury.

One hour ago the Medical Board of Victoria, which is a statutory body appointed by the Governor-in-Council to guard the interests of this State in regard to medical practice, conferred registration upon you, and thereby you became, as I have said, legally entitled to sign a medical certificate. This same Board will view with great disfavour any abuse of this right—possibly to the extent of rescinding your registration to practise medicine, as has been done in the past.

The question of fees to be charged will always present a problem to the conscientious doctor, and I would like to offer you a simple guiding principle. Sickness is a source of mental distress to the patient and to the patient's family. Never allow any account that you may render to increase this distress. Most people are anxious to pay for your services—often they practically hand you a blank cheque. In filling in this cheque, be reasonable; if necessary, inquire as to the financial circumstances of your patient, and remember that no money which will be paid can compare for enduring value with the gratitude and respect of your patient.

These are some of the responsibilities that you have assumed with your registration. There are other problems to be faced. Almost every doctor in practice is threatened at some time by a patient in a manner which amounts practically to blackmail. To guard against this danger the Medical Defence Association offers you protection, and I cannot advise you too strongly to become a member of this association at once.

Always remember that besides being a medical practitioner you are a citizen with a citizen's rights and a citizen's duties. Of these duties I will remind you of one only—the defence of your country. The medical component is an essential element of the defence service—the navy, the army and the air force. In the event of war within Australia any adult between the ages of eighteen and sixty years is liable to be called up for service. In the event of war outside Australia these adults will probably be given the opportunity to serve. The more efficient a peace-time defence force, the less likely is the insanity of war. The one deterrent to the use by the Axis powers in the last war of diabolical chemical and biological warfare was the greater preparedness of the Allies. There are many opportunities for you to prepare during peace to maintain this peace. This is the duty of every decent-thinking citizen.

You are now about to go forth on one of the greatest adventures in the world—medical practice. You have joined a band of medical colleagues who are justly proud and jealous of their reputation throughout the world. We are happy to have you with us and we wish you well.

Finally, I will recall to you the words of George Washington when, as commander-in-chief of the field forces, he had occasion to reprimand one of his officers:

> Every officer in the army when he accepts a commission is clothed with a suit of shining silver armour. Being silver, it tarnishes the more easily. But unfortunately when the silver armour belonging to one officer becomes tarnished the silver of all officers' armour becomes similarly tarnished.

## THE TREATMENT OF ACUTE HÆMATOGENOUS OSTEOMYELITIS.[1]

By J. STEIGRAD,
*Sydney.*

### Review of the Literature.

*General.*

DURING the past three years numerous reports have appeared in journals on the treatment of acute hæmatogenous osteomyelitis. All such reports have been inspired by experiences with the use of penicillin as a chemotherapeutic agent in the treatment of this disease, and it may be said that there is a general agreement among all authors with regard to certain conclusions. These conclusions may be summarized as follows:

1. That the use of penicillin markedly reduces the mortality and the morbidity, and greatly lessens the amount of bone destruction and the ultimate disability from this condition, which in the past has been numbered amongst the most mutilating and deforming infections of childhood.

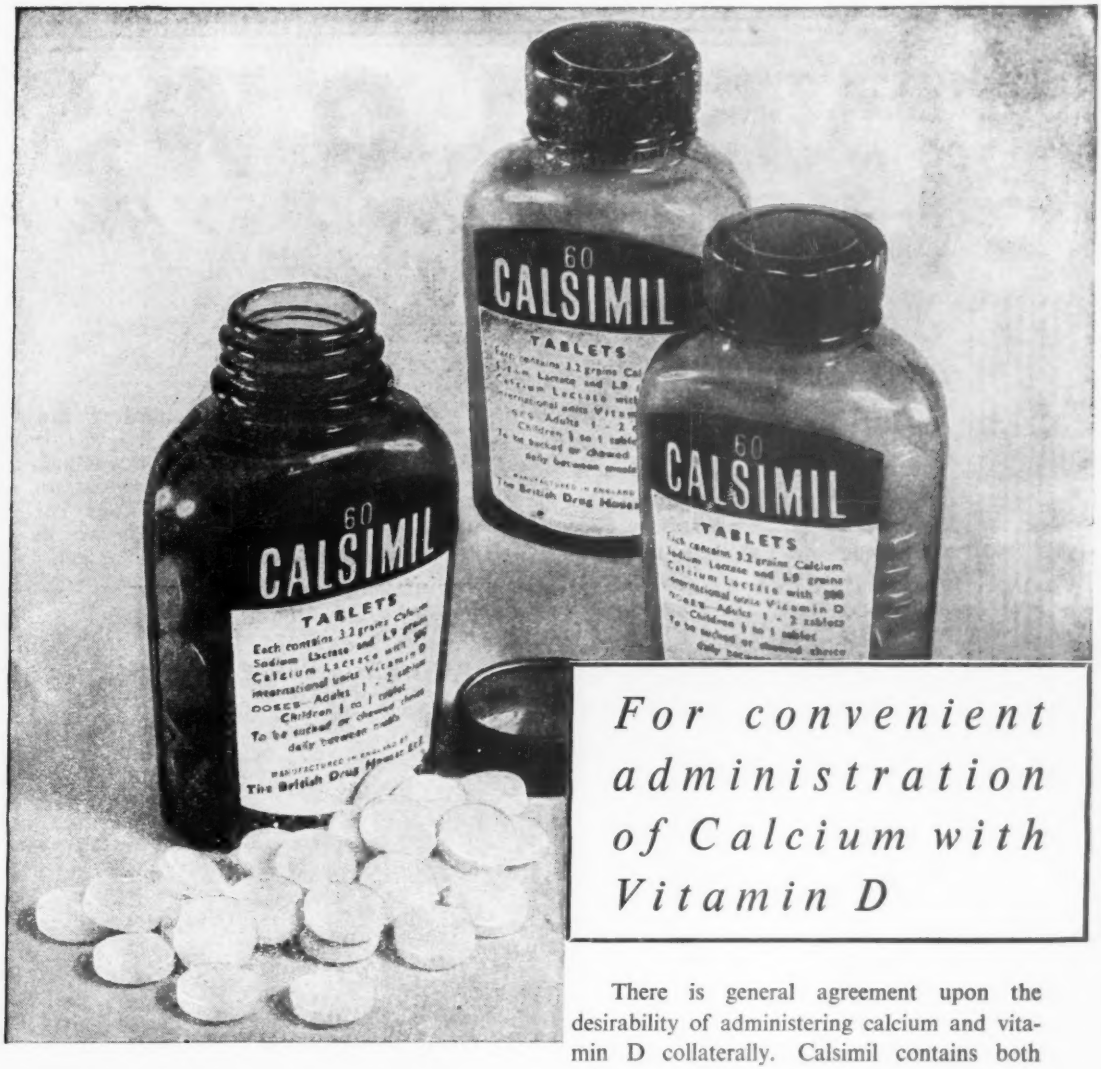
2. That supportive treatment is necessary (*a*) in the form of replacement of fluid, protein, sugar and electrolytes in some sick patients, and (*b*) in the form of bed rest, elevation, splinting or extension in all cases.

3. That, while conservatism is now the general guiding principle in treatment, operative interference at the appropriate time is beneficial in certain cases.

Most of the authors have presented bacteriological studies of their series of cases, and again there is some degree of agreement as to the causative organisms. It would seem that approximately 75% of all cases of acute hæmatogenous osteomyelitis are due to the *Staphylococcus pyogenes aureus*. In the remainder, the streptococcus and the pneumococcus are the most common agents, but occasionally an organism rarely concerned with bone infection, such as the typhoid bacillus, may be found. Fortunately, however, of all the organisms responsible for this condition, 70% to 80% appear to be sensitive to the action of penicillin.

While there is agreement on these general conclusions, there is no unanimity as regards certain details, namely, the dosage of penicillin required and the length of time over which it should be administered, and clear definition as to what constitutes indication for surgical interference.

[1] Read at a meeting of the Section of Pædiatrics, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

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*Dosage of Penicillin.*

The dose of penicillin recommended by authors varies from 1000 units per pound of body weight in twenty-four hours to injections of 400,000 units per day by continuous intramuscular drip.

Higgins, Browne and Bodian used a dose of 1000 units per pound of body weight per day, injected into the muscles every four hours, and found this satisfactory. Buchanan has found that a dose of 2000 units per pound of expected body weight per day maintained a bacteriostatic level, but recommends that this dose be doubled, that is, 4000 units per pound of body weight per day. Trueta advises large doses—400,000 units per day by continuous intramuscular drip for the first three days, 300,000 units for the fourth day, and 200,000 units per day on the fifth and each successive day. Sacks, in a review of the subject, states that the general consensus of opinion recommends 15,000 to 30,000 units every three or four hours. In Australia, McKellar Hall used 20,000 units every two hours for four doses and then every three hours, and McKay used 20,000 units two-hourly with gradual reduction to 15,000 units three-hourly.

*Duration of Penicillin Treatment.*

No author recommends a period of less than ten days, and most favour continuance for fourteen days to twenty-one days. Aird demonstrated by marrow puncture that organisms disappeared from the metaphysis some fourteen days after the commencement of penicillin treatment. However, Sacks quotes him as saying, apparently in a personal communication, that by intramedullary experiments he discovered the presence of viable organisms of a pyogenic character in the local bony lesion after twenty-one days of penicillin treatment. Aird considers that a leucocyte count which has dropped to approximately 10,000 cells per cubic millimetre is a reliable indication for discontinuance of penicillin. Most authorities, however, apparently decide this question by reliance on their own clinical observation.

*Surgery.*

In regard to indications for surgery and the nature of the operative interference there is considerable dispute. In 1946 McKellar Hall was so impressed with the value of penicillin and its results that he thought that it might not be necessary to operate at all. McKay in 1947 reported 20 cases, in 17 of which the patient recovered completely without surgery. Higgins, in his series of 31 cases of acute osteomyelitis, drilled the bone in one, removed a sequestrum in another, incised abscesses in three and performed aspiration in twelve. In the remainder no operation was done. In 1945 McAdam incised abscesses in six cases out of a total of 40, but used intramedullary aspiration in many of the remainder. Altemeier and Helmsworth carry conservatism to the length of continuing conservative therapy in the presence of sequestrum formation and separation. They have reason to believe that, under penicillin therapy, a sequestrum may be absorbed in the same way as a portion of a bone transplant. Trueta considers that, as penicillin "can neither sterilize pus nor relieve the mechanical interference with the blood supply", surgery should supplement penicillin therapy in all cases of acute osteomyelitis in which pus has formed and the bone has already been damaged. He removes as much pus and dead tissue as possible and relieves any tension within the bone by drilling the bone.

## Experiences at the Royal Alexandra Hospital for Children.

Penicillin has been used in the treatment of acute osteomyelitis at the Royal Alexandra Hospital for Children, Sydney, since 1944, and approximately 115 patients were treated in the three-year period 1944 to 1947. A detailed survey of these patients is being made and will be the subject of a report by Dr. J. Gibson, of the surgical staff of the hospital, in the near future, but for the purpose of this meeting clinical impressions and information from my own smaller personal series only are available.

In the ten-year period before 1944, when penicillin was first used in the treatment of acute osteomyelitis, the over-all mortality rate was approximately 10%. Since penicillin has been used there have been no deaths. Since the introduction of penicillin in the treatment the number of days in hospital has been much reduced, and almost all patients, when seen at follow-up clinics, have had normal function. Those practitioners who have been associated with the treatment of acute osteomyelitis will remember the unfortunate children with discharging sinuses being admitted again and again into hospital for surgical interference. They will recollect that, very frequently, the disease appeared to have no ending, and even now we still see the results of osteomyelitis in some patients with bone scarring, joint destruction, ankylosis and gross deformity. Nowadays, penicillin administered early and in adequate amounts over an adequate period appears to obviate these very unsatisfactory results.

At the Royal Alexandra Hospital for Children some operative interference has been necessary in approximately 50% of cases. However, this percentage figure has been taken from a series of cases which includes children admitted into hospital many days and sometimes weeks after the onset of the disease. In many of these cases the diagnosis had been missed and penicillin not used, or penicillin had been used over perhaps short and broken periods. Naturally, abscesses, bone destruction and even sequestra have been present on the patients' admission to hospital. It may be said, then, that cure has been obtained in not less than 50% of cases without resort to surgery. The classification "Cured" includes those patients who suffered bone damage but in whom the end results show no deformity and good function.

The general impression gained is that results are in great part dependent on the stage of the disease at which penicillin therapy is instituted; and further, that with early diagnosis in a case of acute hæmatogenous osteomyelitis due to a penicillin-sensitive organism, and with early and adequate penicillin administration, no or negligible bone damage will occur. This requires the institution of penicillin therapy at a stage of the disease when the infection is still contained within the bone and actually within the cortex. Diagnosis of the acute osteomyelitis at this stage requires a high degree of clinical acumen. When pus has appeared under the periosteum, stripping it from the bone, when the medulla is invaded by pus, or when pus is present as a soft-part abscess, considerable bone damage may have occurred. At any of these stages the diagnosis is not a difficult matter, but careful examination is necessary to establish the diagnosis at the earlier stage, when therapy is most effective.

*Signs and Symptoms.*

Repetition of all the signs and symptoms of acute osteomyelitis is not considered necessary or desirable here, but, because of the importance of early recognition, it is deemed wise to stress the salient symptom, which is pain, and the important sign, which is tenderness.

The pain is present early and is over the infected area, which is usually the metaphysis of a growing bone. The sign is a constant and exquisite tenderness elicited with the tip of the finger over the bone. There may be soft-part swelling and warmth, but generally, at this early stage, there is little else locally. In the acute fulminating or "septicæmic" type of osteomyelitis the local signs and symptoms may be overshadowed by evidence of extreme toxæmia with high fever, delirium, lethargy *et cetera*, and the above-mentioned sign can be elicited only by the most meticulous examination. However, if acute osteomyelitis is kept in mind, it is unlikely that the diagnosis will be missed.

*Differential Diagnosis.*

Acute rheumatic fever, septic arthritis and acute anterior poliomyelitis are the conditions commonly confused with acute osteomyelitis, and our experience in Sydney has shown that the medical attendant may withhold penicillin in the treatment of a patient, mistaking acute osteomyelitis for one of the above three conditions. On the other hand, syphilitic epiphysitis, hæmorrhages under the periosteum

in scurvy, and tuberculosis of a bone or joint may be mistaken for acute osteomyelitis.

Careful examination with a finger tip will select the area of acute tenderness over the bone in acute osteomyelitis, in contradistinction to the generalized tenderness of a painful joint of acute rheumatism. The tenderness in infantile paralysis is in the muscle, and bone tenderness is absent. Differentiation from septic arthritis can be difficult, particularly as it will be realized that both conditions may be present. Careful examination and palpation and perhaps aspiration will usually suggest the correct diagnosis.

*Radiographic Examination.*

It is well known that in untreated acute osteomyelitis bone changes will not become manifest radiographically until ten days have elapsed. If penicillin has been administered early, bone changes may never be detected, even on comparison of the bone with its normal fellow. Experience has shown that after penicillin therapy the appearance of bone changes radiographically may be delayed until the end of the third or fourth week and even later.

### Suggested Plan of Investigation and Treatment.

In order to assist those practitioners who do not customarily deal with many cases of this condition in children, a plan is suggested for the investigation required and the treatment indicated. It is realized that it is not possible to follow any routine in dealing with acute osteomyelitis, but the suggestion is made in the hope that it may be of value to some and in any case will serve as a basis for discussion.

*Investigation.*

1. Radiographic examination is made early to exclude trauma, scurvy, syphilitic epiphysitis and bone or joint tuberculosis, and the examination is repeated on the tenth, twenty-first and fortieth days of the disease and later as required. Comparison with a skiagram of the normal bone is of value and is made in all doubtful cases.

2. Immediate culture of the blood for organisms is made, and a leucocyte count and determination of the blood sedimentation rate are carried out. If the result of the blood culture is positive, it is wise to repeat it daily until the blood is sterile. If the result of the first culture is negative and the temperature remains elevated, a further blood culture is made. The leucocyte count and the determination of the blood sedimentation rate are repeated weekly.

*Treatment.*

*Immobilization.*—Immobilization of the limb in such a manner as to permit inspection of the part affected is indicated in practically all cases. Plaster of Paris splints and skin extension are the methods most commonly used.

*Penicillin.*—Penicillin is injected intramuscularly every three hours in doses of approximately 3000 to 5000 units per pound of body weight in twenty-four hours, and this therapy is continued for a period of not less than twenty-one days. Two examples of the suggested doses are as follows: (*a*) A child, aged ten years, weighing about 60 pounds, with acute fulminating osteomyelitis—a very sick child—was given 50,000 units intramuscularly every three hours for forty-eight hours, 30,000 units intramuscularly every three hours for seven days, and 20,000 units intramuscularly every three hours for fifteen days. (*b*) An infant, aged eighteen months, weighing approximately 25 pounds, suffering from acute osteomyelitis and toxæmia of only moderate severity, was given 15,000 to 20,000 units intramuscularly every three hours for twenty-one days.

*Supportive Treatment.*—At the Royal Alexandra Hospital for Children, supportive treatment in the form of replacement of fluid, electrolytes *et cetera* by the intravenous route has been used rarely. Some of the very ill patients with septicæmia have been given whole blood with, it is thought, some improvement.

*Surgery.*—Nowadays surgery is never of the immediate and emergency type, but is planned and executed with a knowledge of what it is to be expected will be found and done. An abscess in the soft tissues or a subperiosteal abscess is evacuated, but in neither case is this undertaken until penicillin has been administered for at least twenty-four hours. Packing or drainage tubes are not necessary, and the wound should be closed. Most of these wounds heal by primary intention. Drilling of the bone has not been used at the Royal Alexandra Hospital for Children, but if there is doubt about drainage from the bone, it does no harm and very probably assists in reducing bone damage. A sequestrum which has separated and radiographically appears to be lying in a pool of pus and debris should be removed, but if there is no evidence of active infection remaining, it may be left and observed to see if part or all may not undergo absorption. There is no place now for the old operation of guttering the bone in acute osteomyelitis.

*After-Care.*—Immobilization is practised only during the period of penicillin administration, and in some cases it need be maintained only for an even shorter period. Active non-weight-bearing movement may be permitted after the course of penicillin is ended, but weight bearing is permitted only after study of progress skiagrams to ensure that adequate recalcification is present.

### Procedure at the Royal Alexandra Hospital for Children.

The following is the routine instruction at the Royal Alexandra Hospital for Children.

A. In any case of suspected acute osteomyelitis the resident medical officer will: (1) Notify the honorary surgeon. (2) Arrange for: (i) The following emergency investigations: (*a*) blood culture, (*b*) leucocyte count. (ii) The following additional investigations will be requested, but not as emergency measures unless directed by the honorary surgeon: (*a*) penicillin sensitivity tests, (*b*) full blood count, (*c*) blood sedimentation rate. (iii) X-ray examination within twenty-four hours to exclude other conditions, for example, scurvy, syphilitic epiphysitis, tuberculosis of bone or joint.

B. Unless otherwise directed by the honorary surgeon, the resident medical officer will order intramuscular penicillin every three hours on the basis of 5000 units per pound of body weight in twenty-four hours. In very severe cases the dose to be doubled for the first twenty-four hours.

C. *Pathological Tests*: (*a*) Blood culture in positive cases to be repeated until sterile. (*b*) Leucocyte count and blood sedimentation rates to be repeated weekly.

D. *Radiographic Examination*: It is recommended that X-ray examinations be done: (i) within twenty-four hours, (ii) about tenth day, (iii) about twenty-first day, (iv) about fortieth day, and that in all doubtful or early cases the normal limb be X-rayed for comparison.

E. Duration of treatment to be three weeks.

### Anticipated Clinical Progress.

The clinical progress usually follows a pattern. Within two to four days of treatment the patient who has been acutely ill is obviously more comfortable. The child who looked as though he might succumb to the infection looks as though he will surely recover. The temperature generally falls to normal in seven to ten days, and any maintained elevation should suggest that the condition is due to a penicillin-resistant organism. A rise in temperature after a fall to normal suggests that a subperiosteal abscess may have been missed. If bone damage is absent or slight, the patient may leave hospital within thirty days.

In the presence of osteomyelitis due to a penicillin-resistant organism, a sulphonamide drug is used, and in some cases, for example, salmonella infection of bone, streptomycin has proved of value.

### Summary.

1. Experiences in the treatment of acute osteomyelitis, as reported over the past three years, have been briefly reviewed.

2. There is a general agreement as regards the value of penicillin as a chemotherapeutic agent and the change it has produced in the treatment, prognosis and after-care

of the patient. However, there is no unanimity as regards the dosage of penicillin and as to the precise place that surgery now plays in the treatment.

3. Experience gained at the Royal Alexandra Hospital for Children in the treatment of acute osteomyelitis, indicating an agreement with authors, is presented. The importance of early diagnosis and of the early institution of penicillin therapy is stressed and the salient features of diagnosis are discussed.

4. A suggested plan of investigation and treatment is submitted with a view to assisting those who have not had the opportunity of close study of these patients.

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## DELAYED LABOUR.[1]

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THE problem of delayed labour is a difficult one. Greater understanding and sounder treatment of it remain our objectives. Ever greater research is being devoted to it. The literature is large. In this complex and too often conflicting array of ideas the student, practitioner and specialist face confusion. So much in obstetrics is theoretically correct, but in practice wrong. The merely "aseptic" midwife at times may have had more success than the practitioner or specialist. This is the reverse of desirable. A little knowledge is said to be dangerous. An excess of theoretical knowledge may be equally so. There can be no hope of advancement in midwifery for us, or for those to follow us, without a sane stock-taking of the situation. Uniformity of outlook in obstetricians is probably unattainable, but at least clarity of fundamental principles should be universal.

The obstetrician who in delayed labour fights a rear-guard action and emerges with a healthy mother, although sometimes with a stillborn child, may be entitled to respect and praise. He seldom gets them. By contrast, others may capitulate to Cæsarean section, sometimes almost unconditionally. Discussion on this cleavage of obstetric outlook will be valuable. No man holds the key to every such obstetric problem. Let it be our aim to strive for correct decisions.

Only some aspects of such a large subject can be touched upon. My feeling was that it would be most useful to view and discuss it from a preconceived ætiological background. In turn these most important causative features can be brought to bear in the analysis of any given case. My plan divides the causes into the well-known three groups in the following order: (i) the passage, (ii) the forces, (iii) the passenger.

[1] Read at a meeting of the Section of Obstetrics and Gynæcology, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

### THE PASSAGE.

Dystocia arises more often from the soft parts than from the bony passage—for example, from atresias, neoplasms, rigid cervix, uterine displacements, pendulous abdomen and previous surgical operations. Myomata relatively seldom complicate labour, although lower segment tumours may do so. The prognosis in early pregnancy may be completely reversed at labour. All types of myomata may delay labour by interfering with uterine contractions, although they are not obstructive.

#### Treatment when Surgery is Imperative.

Surgical measures are imperative in the following circumstances. (i) Pedunculated fibroid tumours should be excised. (ii) Interstitial fibroid tumours should be enucleated; but avoid operation if possible. (iii) For multiple myomata Cæsarean section and hysterectomy may be the best treatment.

#### Ovarian Tumours.

When ovarian tumours are suspected the diagnosis should be made and operation undertaken as early in pregnancy as possible. Such tumours may cause obstruction or may rupture or become infected. If they are found late in pregnancy they may or may not be impacted. If such a tumour is impacted, it may be removed and Cæsarean section may be performed; if it is not impacted it should be removed in the puerperium. It is not advisable to try to replace a tumour by pushing it out of the pelvis nor to attempt to puncture it through the vagina. Both procedures may cause peritonitis, particularly if the tumour is a dermoid cyst.

Such abnormalities in the soft parts are serious reminders of what may be found on examination during pregnancy.

#### The Bony Pelvis.

The contracted pelvis is one in which one or more of the diameters are so diminished that they can interfere with the mechanism of labour.

It is my view that the careful examination of the pelvis of the pregnant woman is of the first importance. It transcends almost all other forms of examination during pregnancy. A fanatical enthusiasm for careful examination must be inculcated. We are indeed fortunate in Australia in the frequency of the normal pelvis. However, the abnormal pelvis is not rare, and if our patient has one it behoves us to know it. Awareness of it may mean triumph instead of tragedy. Painstaking clinical examination and pelvimetry must precede pelvioradiography. The latter is advancing in technique and obstetric value, but even today the trained obstetrician's fingers are often more reliable than X-ray examination.

Pelvic deformity and pelvic contraction should be noted by the history, pelvimetry and digital examination and confirmed by X-ray examination. Astounding errors can arise by exclusive reliance on pelvioradiography. However, the most experienced radiologists have attained high efficiency. The ideal cooperation is that of the skilled obstetric examiner and the radiologist, pooling their ideas. Too much must not be expected obstetrically of the radiologist. Apart from inheritance, contracted pelvis is said to depend upon nutritional conditions in childhood. The baby's head applied manually or in trial labour is the best pelvimeter of the inlet. The chief value of external measurements is their suggestive indication of the type of pelvis. Measurements of the outlet and digital examination of the pelvic basin are all helpful in some degree. At least a fist measurement of the outlet should be made in every case. We must appraise the pelvis and the soft part of every parturient to answer two questions: (1) Is this patient to have a vaginal or abdominal delivery?

(ii) If vaginal delivery is intended, may the pelvic type and size modify the normal mechanism and may this fact influence the vaginal mode of delivery?

The rhomboid of Michaelis is said to be a useful indication of a normal pelvis if the vertical and transverse measurements are 11 centimetres each.

The study of contracted pelvis has been greatly advanced by Caldwell and Moloy. Four large parent types are described by them: (i) gynæcoid (normal female pelvis), (ii) android (with male characteristics), (iii) anthropoid (like that of the female great ape), (iv) platypelloid (similar to the flat pelvis of older classifications).

The importance of recognizing these types is that they may have distinctive mechanisms. There are many other rare types of contracted pelvis, but these distinct types must be recognized.

*The Gynæcoid Pelvis.*

The normal female pelvis has a broad subpubic arch and a wide sacro-sciatic notch. Anterior positions of the fœtus are common in this type of pelvis.

*The Android Pelvis.*

The android pelvis possesses male characters; the sacro-sciatic notch is long and narrow, the sacrum slopes forward. The subpubic arch is narrow. The descending rami are heavy and the forepelvis is narrow. This pelvis Caldwell and Moloy consider the most dangerous pelvis, because the forepelvis is narrow, all four walls converge as a funnel, and posterior positions of the fœtus are common. Forceps or breech extractions may be most difficult. Elective Cæsarean section may be best in severe cases.

*The Anthropoid Pelvis.*

The anthropoid pelvis has transverse contraction. This often prevents engagement in the transverse diameter. Antero-posterior engagement is often the only possibility, and often with the occiput posterior on account of the narrow anterior part of the inlet. Rotation of the head may be difficult and delivery in the persistent occipito-posterior position may be the correct treatment.

*The Platypelloid Pelvis.*

The head must engage in the transverse diameter of the inlet. It is an uncommon type and the head must be allowed to descend transversely to the pelvic floor. Caldwell and Moloy's dictum in these four pelvic types is as follows:

> The fœtal head in its descent attempts to adapt itself to that diameter of the inlet most suited for its reception. If arrest occurs and forceps become necessary to effect delivery, the fœtal head must be made to pass through that diameter most suited to its reception.

Rohan Williams, radiologist at Queen Charlotte's Hospital, and L. G. Phillips,[1] think undue pessimism may be attached by the radiologist to the subaverage outlet. However, they emphasize that the combination of a narrow subpubic arch, an ischial bispinous diameter of less than 3·8 inches and a pubo-sacral diameter of less than 4·0 inches (the lower strait of the funnel pelvis) carries a serious significance.

We must know the shape of the pubic arch. This is easily determined with the fingers. The distance between the tuberosities can be measured even by the fist or fingers. If the space is less than an average-sized fist, the posterior sagittal diameter must be at least 9·0 centimetres.

*Comment.*

The simple lesson to be learned is that we must be pelvis conscious, and refer for examination any patient with a pelvis about which there is any doubt as to its normal size and shape. I am not aware of any extensive study of the types and their percentages among Australian women. Such research would be valuable. In cases in which the pelvis is subnormal in size or abnormal in shape this is better not revealed to the patient until late in pregnancy; it is time enough then to test out the patient's mind. The doctor's and the patient's attitudes may be vastly different. When the patient engages her doctor he hopes to deliver a living baby *per vaginam*. She, on the other hand, thinks only of her living baby, born by any method. This hiatus in relationship must be fully considered.

In borderline cases, unless there are other contra-indications a trial labour should be given. Success can be surprising. A flat pelvis is more favourable than a generally contracted pelvis. Trial labour may be difficult to supervise in a private hospital. After the membranes have ruptured, rectal, abdominal or aseptic vaginal examination will decide the question. Should trial labour fail, Cæsarean section, lower segment or classical, should be performed.

When the presence of a contracted pelvis has been neglected and obvious infection is present, the choice lies between craniotomy if the child is dead, and low cervical section or Cæsarean section with hysterectomy if the child is alive. Penicillin and sulphonamide drugs are valuable here.

It may appear that I perhaps over-emphasize contracted pelvis in Australia. This is rather deliberate on my part, to awaken interest, to induce awareness that contracted pelvis does occur, and to cause some valuable ideas from Caldwell and Moloy's study to be taken to heart. The knowledge gained in examining the pelvis of our patient in the ante-natal stage will help us, but all possible examinations should be done in the delayed labour case (the patient being first examined as an "emergency"). The same principle must guide us in each instance, although the patient examined during pregnancy should obviously be at a greater advantage.

Finally, the greater his experience, the more the obstetrician tends to refrain from meddlesome midwifery. There are so many astoundingly successful vaginal deliveries that, except in the presence of severe pelvic contraction, trial of labour has emerged as a sound necessity in management. Moreover, the greater the scientific investigation, the greater the necessity for a physiological as distinct from a purely mechanical outlook. Nothing must entirely replace the physical examination of the pelvis, and of course the estimation of the size of the unborn child. In short, the greater the whole examination of the pelvis, the more critical must be the judgement in order to avoid dangerous and meddlesome midwifery.

## THE FORCES.

The severely contracted pelvis and the minor contractions and pelvic deformities are of obvious importance. The physiological forces which constitute labour are, however, in all cases the most vital factor.

When contractions are weak from the beginning and throughout, we have true primary uterine inertia. The fact that the incidence of Cæsarean section in most average communities in Australia hardly reaches 1% shows the infrequency of the necessity to perform the operation for pelvic contraction.

The corollary is that Nature's uterine forces, with or without assistance, can often push the fœtus through the pelvis. Still, the failure of efficient contractile power of the uterus in labour can be a most grave problem. It can be imagined how even more difficult this state can render the cases of unengaged head, malpresentation *et cetera*.

Secondary inertia may follow previously normal contractions or previous primary inertia. In a case of true primary inertia false labour pains may have occurred days or weeks before. One-sixth of a grain of morphine will abolish false labour pains, but not usually true pains.

### Ætiology of Primary Inertia.

The following are some of the ætiological factors in primary inertia: (i) poorly developed uterine musculature—example, infantile uterus; (ii) anomalies of uterine innervation (previous dysmenorrhœa); (iii) loss in tone of uterine musculature, hydramnion or twins; (iv) mechanical interference, as from fibroid tumours or a full bladder or rectum; (v) a large fœtus; (vi) fear.

Willard Cooke (quoted by Walser[2]) makes the following statement:

> Fear of the unknown in labor seems to be the origin of most of the inhibitions of motor function, and of the exaggeration of pain, and in fact constitutes the real difference between the primi-gravida and multi-gravida in labor.

Grantley Dick Read tries to enable the patient to acquire the ability to relax her nervous, emotional and physical self so that the interpretation of pain stimuli is less rigorous. Pregnancy and labour should be physiological processes. However, because of the complete control of the reproductive system by the sympathetic and parasympathetic nervous system, the function of reproduction is very susceptible to emotional stimuli—for example, fear. The obstetrician should avoid speech calculated to arouse fear in the patient or any idea of danger in her mind. He should promote the fullest confidence.

While the membranes remain unruptured there is no great threat to the fœtus or mother. A snug abdominal binder is sometimes useful. The relatives should be reassured, if one is satisfied that there are no obstructive causes. As far as the patient is concerned, do not admit that labour has started before you are satisfied of it. Rest at night for the patient and reassurance are the main points in treatment. The patient with typical primary uterine inertia in labour often has almost continuous pains. The uterus never properly relaxes. I have often called it the "sponge rubber" uterus on palpation, and in action I have called it the "stuttering uterus". Prolonged labour has been defined as one lasting thirty or more hours, precipitate labour as one that terminates within three hours, and the remainder as normal. In one study prolonged labour preceded 3% of the total number of deliveries, and *primigravidæ* formed 70% of the group. In this series uterine inertia was the principal cause of prolonged labour.

In the outstanding thesis[3] of O. S. Heyns, M.R.C.O.G., of the University of Witwatersrand, Johannesburg, and S. Shippel, in regard to the South African Bantu woman, the following statement is made:

> Bantu experience further strengthens the concept that faults in the powers are responsible for most dystocias, for simple dystocia due to contracted bony passages can almost be eliminated by fostering the will in a parturient to deliver herself.
>
> Incidentally the Bantu woman has a pelvic area much below that of the white woman and the average baby is 6¾-7 pounds. The Bantu woman feels that she has to depend on Nature for her delivery, and she believes that death in childbirth is the alternative to success. Bantu women have delivered spontaneously with pelvic areas below 70 square c.m. This was unexpected. This and other features of the cases considered have led to the conclusion that the South African Negro as a parturient is greatly superior to the white woman. It has been suggested that the difference lies in the powers (uterine and other muscular action) which are used to the full in the Negro, but suffer a partial inhibition in the white woman.

## Treatment.

These cases can be the most difficult and worrying of all confinements. I am in accord with Professor B. T. Mayes's outlook in treatment. Potential inertia may be suspected during pregnancy—that is, in the nervous woman. On the other hand, it has been my impression that in a considerable number of cases the patient appears outwardly very calm. She has perfectly concealed her fear, which on later questioning you find actually was very real. Professor Mayes suggests the following measures as helpful in potential inertia: (i) sensitization in the last four weeks of pregnancy by quinine or by stilbœstrol; (ii) in developed inertia one-sixth or one-quarter of a grain of morphine will eliminate the false pains and clarify the diagnosis. Do not admit to the patient, and certainly not to her relatives, that she is in proper labour until you are sure; call the pains premonitory signs. A motor drive on the first or second day of a long labour may break the monotony. The rule is: (i) stimulants by day, (ii) sedatives principally at night.

The stimulation of the uterus, as Professor Mayes observes, is not easy. Quinine can be used. I admit the preference for limited dosage, not more than ten grains in all. A warm enema with a little glycerin is useful; be sure the nurse does not burn the rectum. I am afraid of pituitrin in such cases. A firm but friendly nurse can be of great value to patient and doctor. I am afraid the so-called special nurse can be rather unhelpful; she can be too much dominated by the patient. Glucose given intravenously for physical and mental fatigue appears to me to be most sound, as are frequent small nourishing meals. Willett scalp forceps may be useful. Potassium bromide and chloral hydrate are useful to steady the nervous system. "Nembutal" has its place. Morphine (one-sixth of a grain), hyoscine ($^1/_{100}$ grain) and atropine ($^1/_{150}$ grain) give sleep and strengthen uterine contractions. Light anæsthesia with nitrous oxide and oxygen may be used in the later stages. Incision of the cervix, as mentioned, has a place, although uncommonly, in cases in which the pelvic organs are normal. I had such a case of undilated external os a year or two ago; I incised the cervix with successful results, the thinned cervical os being the size of a threepence at 2, 4, 8, and 10 of the cervical clock. Cervical stenosis may arise frequently from previous operations or from cervical disease. Timely forceps assistance is valuable to mother and fœtus. Craniotomy may be necessary to deliver an oversized dead child. My feelings are against the use of Cæsarean section in primary inertia if the passage and passenger are normal. Discreet sounding of the patient and her husband as to their wishes at a correct time in labour may answer the question of Cæsarean section in an individual case. Of course, they must first be made fully aware of the advantages, disadvantages and dangers of Cæsarean section. I would welcome the opinion of this meeting on this question.

## The Passenger.

In such a wide subject as prolonged labour it is clear that only limited remarks are possible in a short paper. I will content myself with some observations on two common obstetric abnormalities, the occipito-posterior position and breech presentation.

### The Occipito-Posterior Position.

The occipito-posterior position has been long and universally recognized as providing cases of difficult labour; yet in spite of this fact it is most surprising that eminent obstetricians in various parts of the world produce paper after paper ranging themselves into two groups, the minor group describing it as a normal position, the major group stressing its potential difficulties and dangers to mother and fœtus. I express myself as bewildered by such a contradictory, unsound and unsatisfactory situation. For both teaching and practice it is most confusing. Surely, between the serene confidence of the minor group and the cautious outlook of the major group, there must be some light brought into the darkness! Perhaps neither outlook is entirely right. Some unknown factor may have been overlooked which could harmonize both views.

I have been bold enough to suggest some such factor. It may be right. It all hinges on the understanding of the mechanism of labour. Without a clear understanding of the mechanism of labour, even in the normal pelvis, we cannot successfully go far. My views will shortly be published.

Accurate diagnosis of the occipito-posterior position is essential in prolonged labour. Once this is known, the conduct of the case will be on watchful obstetric lines and each case will be managed according to its successful progress or to its failure. This applies even to the normal pelvis; how much more must it apply in principle to the abnormal pelvis, both in size and in shape! Only by a mastery of the normal can we hope to understand and grapple with the abnormal. This is indeed a situation in which previous knowledge of the patient's pelvis will help us to judge the necessity for any variations of management. No student should have under-estimated for him the difficulty that may be encountered in occipito-posterior

positions. My ideas are an effort to clarify the understanding of the abnormality.

The management of the occipito-posterior position varies. In the Dublin school, manual rotation I believe is infrequently employed. In the British school it is more freely used. In America the use of instrumental rotation of the fœtus in the persistent occipito-posterior position is common. Anthony D'Esopo, of Columbia University, stresses the narrow fore-pelvis as a factor in the causation of the persistent posterior position. This type of pelvis certainly would predispose to it. The detection of a grossly abnormal pelvis with contractions of the brim, cavity or outlet must receive full consideration in each individual case, as must also the size of the child.

Manual rotation should always be given a proper trial after full dilatation of the cervix. When a fœtus in an occipito-posterior position is low on the pelvic floor it may be better delivered thus with the aid of a deep episiotomy. Kielland's forceps are favoured by some obstetricians as a means of rotating the fœtus in the occipito-posterior position. I favour manual rotation wherever possible, and the fœtus need not always be delivered by forceps straight away, although this is often the correct procedure.

### Breech Presentation.

The importance of breech presentation is recognized; commonly it provides cases of delayed labour. The fœtal mortality rate, although varying in many clinics, is high—up to 30% among *primigravidæ* and 10% to 15% among *multiparæ*. More favourable figures are yielded in many clinics, but these are obtained only by a most studied mastery of the difficulties of breech delivery.

The wider employment of external version is one important mode of prevention. My own practice is to try to perform version as early as the thirty-second week of pregnancy and repeat it if necessary. It seems to me more important to commence early with a small fœtus and repeat the procedure than to wait longer before the first version, with the idea that the fœtus will stay turned. Moreover, turning of a larger fœtus with extended legs presenting by the breech is not only hard or impossible, but also not without danger. Before persisting in version with a larger fœtus in a *primigravida* I prefer to have the patient radiologically examined. I do not generally lean to version under anæsthesia. If the pelvis is within normal dimensions I regard as best left alone the fœtus presenting by the breech that is difficult to turn after reasonable efforts. If there is any doubt at all, an X-ray picture will prevent the blunder of trying to perform cephalic version in an already existing head presentation or in the presence of twins.

An X-ray photograph will also eliminate true hydrocephalus. Incidentally, a bad X-ray picture may suggest hydrocephalus which actually is absent. Always radiologically examine a patient with a supposed breech presentation before Cæsarean section.

In a breech presentation, then, absolute pelvic disproportion having been eliminated and version having failed, one has to deliver vaginally a fœtus presenting by the breech. How is it to be done? To my mind the greatest promise of success does not depend only upon patience and skill; of supreme importance is the breech delivery team. By a team I mean not only the anæsthetist and normal nursing assistance, but an alert, "aseptic", gloved and gowned assistant who awaits you, ready to act.

My advice in management has been to keep the fœtus as compact as possible to the end of delivery. Keep the fœtus like a four-bladed pocket knife, as it were, and do not open the blades too soon. Induction of labour in a breech presentation before the fœtus becomes too large is well worth consideration in regard to the "within normal limits" pelvis.

#### *Impaction of the Breech.*

If impaction of the breech occurs, several courses of action may be taken.

If the impaction is at the brim and absolute or relative disproportion exists, perform a Cæsarean section. If no disproportion is present, give mild sedatives and wait; if there is no progress and enough dilatation of the cervix, a leg may sometimes be safely brought down.

If the impaction occurs at the ischial spines, a leg may be brought down.

For delay of the breech on the perineum there are various treatments: (i) the bringing down of one or both legs, (ii) groin traction, (iii) the administration of three minims of pituitrin. (I have found this useful in some cases with or without the bringing down of a leg. Such a small dose cannot do harm and may just give that little extra descent.)

#### *Other Points.*

The Burns-Marshall method is a valuable advance in delivery of the after-coming head. The Lovset technique for delivery of the arms is a clever manœuvre. Episiotomy is extremely useful. Local anæsthesia of the perineum and the pelvic floor is also helpful. Fundal pressure is an essential aid. The fœtal heart, as in other presentations, should be carefully watched. One more point I have found necessary to keep in mind: be sure that the cord is not stretched across the breech; the fœtus will thus be sitting in a swing on its own cord and be asphyxiated. Forceps also are most valuable for delivering the after-coming head.

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## THE TREATMENT OF EMPYEMA IN INFANCY IN CHILDHOOD.[1]

By DONALD HIPSLEY,

*Sydney.*

EMPYEMA THORACIS was one of the earliest diseases recognized in antiquity, and Hippocrates advised its treatment by drainage. Henry Koplik in a paper read before the annual meeting of the American Pediatric Society in 1890[1] reviewed the knowledge at that time of the ætiology and treatment of *empyema thoracis*. He then stressed the fact that the subject of the ætiology of empyema in childhood was one of the first importance. This paper was an attempt to inquire into the ætiology from the standpoint of the bacteriology of those times. He appreciated the fact that in infancy and childhood the factors of predisposition and exciting cause are modified in their action, and that severe processes are borne with a resistance and impunity in the growing child not to be expected in the adult, and for this reason the treatment of this disease is more satisfactory in children than in adults.

Koplik reported twelve cases of empyema and divided them into the following groups.

Group I. Cases in which the bacteriological results were not uniform and the microorganisms found were not diagnostic, that is, the hæmolytic streptococcus or hæmolytic staphylococcus. There were three patients in this group: a male, aged twelve years, with a streptococcal infection, a female, aged seven years, with a streptococcal infection, and a male, aged eleven months, with a staphylococcal infection. Having eliminated tuberculosis in these three cases, Koplik was in doubt as to the actual ætiology; he might have assumed that they were complications of pneumonia, as at that time it had already been proved that the streptococcus and staphylococcus occurred as mixed infections with pneumonia, or they could have arisen spontaneously with the predisposing aid of cold or

[1] Read at a meeting of the Section of Pædiatrics, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.


and serious complications may easily be the result if regarded lightly.

The patient with a heavy head and a nose which refuses to allow a free passage of clean air is not asking too much when he seeks relief.

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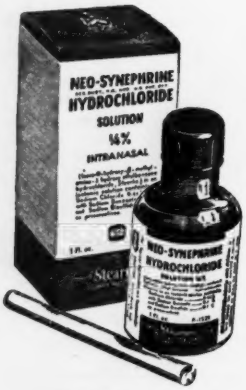


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slight trauma, although he could find no history of trauma in any of these cases.

Group II. Cases in which the pneumococcus was identified in a pure and uncontaminated culture. There were seven patients in this group, six males and one female, whose ages ranged from five years to two and a quarter years.

Group III. Cases of empyema occurring in tuberculous subjects. As far as Koplik could ascertain this condition did not arise in children. He found one case, in a boy, aged eight years, who had a tuberculous empyema contaminated with streptococci. Koplik also maintained that when in any case careful examination of the pus yielded an absolutely negative result, he was justified in assuming the possibility of tuberculosis, for in most of these cases, when a post-mortem examination had been made, tuberculosis had been established. This assumption was apparently made from examination of his results in relation to adults only. There were, of course, the other two classes of tuberculous empyema also occurring in adults, in which the tubercle bacillus was demonstrated by smear examination and culture, either alone or contaminated with other organisms, such as the streptococcus.

Group IV. Cases in which, with some degree of probability, a focus of suppuration situated outside the chest could be found as a possible source of infection. There was one patient in this group, an infant of four months, who had a deep burrowing abscess of the foot and also a vaccination pustule, which looked angry. This child died two days after the pus was demonstrated, with the typical symptoms of empyema. Post-mortem examination was not carried out.

In conclusion, Koplik pointed out that a large proportion of empyemata in children followed or complicated processes in the lung of an acute character; with early and efficient treatment, these conditions should be faced hopefully. He regarded tuberculous and pyæmic conditions as being the stumbling stones of pædiatric practice. I shall endeavour in this paper to show that this is also the case today.

### Causation.

The causation of *empyema thoracis* may be primary or secondary.

Primary causes are (i) direct spread from the lung as a result of lobar pneumonia (pneumococcal) or bronchopneumonia (streptococcal); (ii) the aspiration of infected material, for example, from the mouth, nose and pharynx, causing bronchiectasis, lung abscess or empyema according to the size of the particles; the larger particles are held up in the bronchi, the smaller in the bronchioles and the smallest in the alveoli causing subpleural abscesses.

Secondary causes are: (i) rupture into the pleura from a localized lung abscess; (ii) a pyæmic process; (iii) lymphatic spread from a subphrenic abscess through the diaphragm; (iv) direct spread from the mediastinum, following either mediastinitis or malignant disease; (v) a penetrating wound of the chest.

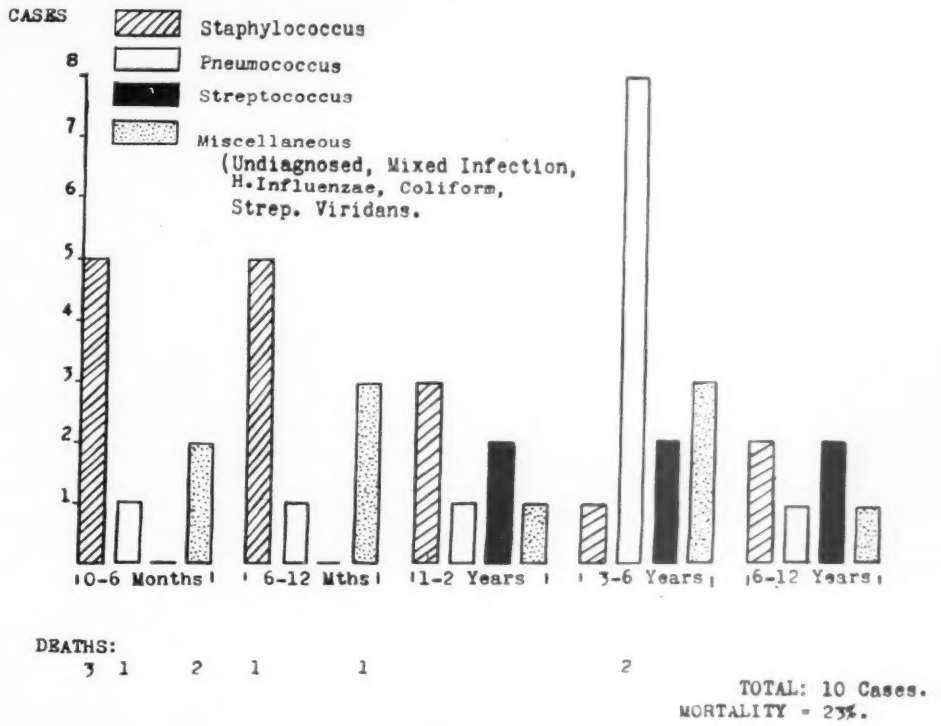


FIGURE I.

Graph showing the ætiology of empyema and mortality figures in a series of 43 cases.

The condition of secondary rupture into the pleura of a localized pulmonary abscess may occur spontaneously or as a result of treatment, such as when rupture of a peripheral pulmonary abscess follows needling of the thoracic cavity. This is a very serious complication, as the whole pleural surface is involved and absorption of toxins is intense.

### Ætiology (Bacteriological).

An analysis of the case records of the Royal Alexandra Hospital for Children, Sydney, for the period 1942-1947 revealed that 43 cases of *empyema thoracis* had occurred.

It will be seen by referring to the graph (Figure I) illustrating the ætiological organism in this series, that *Staphylococcus aureus* is by far the commonest organism isolated in the infancy group, and even up to the age of two years it still leads the field. Other organisms occurred sporadically in all age groups. The streptococcus was not found at all until the early childhood groups, and the pneumococcus appeared to be more prevalent in the late childhood groups. Other organisms, *Hæmophilus influenzæ*,

the coliform bacillus and *Streptococcus viridans*, occurred in isolated cases only. The tubercle bacillus was not isolated in a single case. Acid-fast bacilli were found in the pleural fluid in one case, which is discussed later. In this case the condition was treated as tuberculous pleural effusion, streptomycin and penicillin being given. Extensive bacteriological investigations (examination of smear, culture on Petragnani's medium and guinea-pig inoculation) did not establish a diagnosis of tuberculosis. *Pseudomonas pyocyanea* was eventually recovered in this case and the patient responded rapidly to streptomycin injected locally into the empyema cavity.

A glance at the mortality figures shows that this series is in agreement with those reported by other authors, in that *Staphylococcus aureus* carries the greatest mortality rate among young infants. There were three deaths from the five cases of staphylococcal empyema in infants under six months and one death from the five cases in the six to twelve months group.

Riley[3] states that the incidence of empyema caused by all organisms has fallen off greatly since the introduction of sulphonamide therapy, but that, despite this, empyema caused by *Staphylococcus aureus* has remained about constant, and consequently has increased in relative frequency.

Philips and Kramer[2] have shown that all the available reports from 1939 to 1944 record mortality rates varying from 55% to 100% in young infants with staphylococcal pneumonia and empyema; they themselves report a series of five cases in infants under the age of three months in which the organism was *Staphylococcus aureus*, and in which only one death occurred. In their opinion this is due to the use of penicillin. In this series two patients required rib resection and two only had penicillin injected into the thoracic cavity. All had penicillin given intramuscularly and sulphadiazine given orally.

The greater mortality rate among infants under four months of age has also been noted by Ladd and Swan,[4] who have suggested that an abnormal pathological and immunological response to staphylococcal infections exists at this period. They cite the danger of mediastinal shift and flutter due to failure of mediastinal fixation and the tendency to widespread hæmorrhagic pneumonia rather than abscess formation as contributing factors.

### Treatment.

This series includes patients treated before the introduction of penicillin and streptomycin, and all the patients subjected to rib resection were treated during this period.

The only death in the series amongst those who were actually treated for empyema (Table I) was that of a boy, aged four years, who had rib resection performed after an illness of two months' duration. He died three months after the operation, following a sudden atelectasis, and at post-mortem examination was found to have congestive cardiac failure and pericardial effusion. In all the other patients who died, empyema was revealed only at autopsy; eight were under the age of twelve months, and of these six were under the age of six months; this shows that the mortality is higher in early infancy.

TABLE I.

*Table showing Relationship between Method of Treatment and Deaths in the Series of 43 Cases.*

| Treatment. | Patients Aged Under One Year. | | Patients Aged Over One Year. | |
|---|---|---|---|---|
| | Cases. | Deaths. | Cases. | Deaths. |
| Aspiration alone .. .. | 5 | 0 | 5 | 0 |
| Intercostal drainage .. | 4 | 0 | 5 | 0 |
| Rib resection .. .. | 0 | 0 | 14 | 1 |
| No therapy (diagnosed at autopsy) .. .. .. | 8 | 8 | 1 | 1 |
| Total .. .. .. | 17 | 8 (47%) | 26 | 2 (7·7%) |

Ten patients were treated by aspiration, and some of these in addition had both penicillin instilled into the empyema cavity and also penicillin injected intramuscularly. In addition, in two of these cases, sulphadiazine was given orally. No patient in this series required more than three instillations of penicillin, and in three cases only one instillation was necessary.

Nine patients were treated by intercostal drainage by means of a catheter without rib resection. Penicillin was given in these cases, both intramuscularly and by instillation into the empyema cavity. Some of these patients also received sulphadiazine orally.

The local use of penicillin in the treatment of empyema appears to have almost abolished the necessity for rib resection. Early and efficient penicillin administration, parenteral and local, after aspiration, and then, if progress is unsatisfactory, controlled drainage by means of a catheter inserted between the ribs, appear to form the best method of treatment.

The old method of treatment by rib resection and insertion of a rubber tube, with drainage into a dressing, is safe only at a comparatively late stage in the disease when the lung is fixed by adhesions.

Closed drainage may best be obtained by means of an efficient system whereby controlled amounts of fluid may be removed from the thoracic cavity and gradual decompression of the lung achieved, the dangers of mediastinal flutter being thus avoided; the treatment may be instituted early in the syn-pneumonic phase, the risk of chronic empyema being thus avoided.

Fatti, Florey, Joules and Humphrey[5] report a series of 24 cases of acute infected pleural effusions, with various techniques of penicillin treatment. They assessed their results of success or failure of each technique by comparison of their results with a series of controls. In this series there were three cases of rib resection, the condition in two being due to hæmolytic and in one to anaerobic streptococci. In every instance, at the time rib resection was carried out, the pus was found to be sterile. All three patients became secondarily infected with *Staphylococcus aureus* after treatment had been discontinued, and the total periods of illness and times from drainage were of the same order as those of the controls. These workers regarded all three cases as failures, and this method of treatment was abandoned completely when it was realized how badly these patients were progressing compared with others treated by other methods. The authors conclude that the technique of choice is aspiration and injection of penicillin, as soon as the effusion is recognized, followed, once it becomes purulent, by intercostal drainage and then instillation of penicillin.

#### *Technique of Treatment.*

When the presence of fluid is suspected in the pleural cavity, exploratory needling should not be commenced unless penicillin is available on the dressing trolly, ready for use. This point is stressed, for often it is difficult to find the collection of fluid at subsequent attempted aspirations, and it is essential to get the penicillin into the pleural effusion at the first aspiration. Often this instillation of penicillin is sufficient to sterilize the fluid.

When the fluid is located, as much as possible is aspirated, without causing distress to the patient, and approximately ten millilitres are put into a sterile test tube for bacteriological examination.

About 15 to 20 millilitres of penicillin in normal saline (strength 2000 units per millilitre) are then slowly injected into the cavity, the patient's condition being carefully watched to see that the procedure causes no distress and that no yellow fluid is coughed up indicating the presence of a broncho-pleural fistula.

If the bacteriological report indicates that the fluid is infected, this procedure is carried out on alternate days.

Penicillin will temporarily sterilize the pus, but if it continues to thicken, surgical drainage is usually necessary.

The patient is given suitable premedication with morphine and "Nembutal", and after anæsthetization of the proposed site of introduction of the drainage catheter, an exploratory needle is again introduced. An X-ray film

should also be available in the theatre to aid in the sighting of the catheter.

The catheter should be of pressure tubing and should accurately fit into the cannula. It should also be marked so as to indicate how much of the tube is in the empyema cavity.

An incision is made in the skin only, and a trochar and cannula are inserted. Every precaution should be taken to see that air does not enter the pleural cavity during insertion of the catheter, which is then passed through a square of sponge rubber. The end of the catheter is closed with a piece of tape, the sponge rubber strapped to the chest wall and a sterile dressing towel pinned around the patient's chest.

An X-ray picture is taken on the day after insertion of the intercostal drain, after the cavity has been drained. This will show not only the location of the tube, but also any evidence of residual fluid.

Drainage is carried out twice daily by connecting the tube to a negative-pressure apparatus for about half an hour (Figures II and III).

Again it is essential to take every precaution against the entry of air into the pleural cavity by first clamping off the tube, and taking off the clamp only when the catheter is

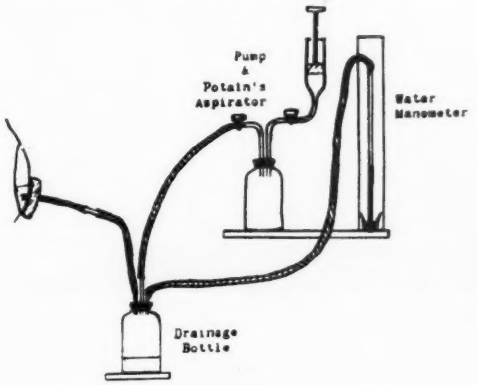


FIGURE II.
Diagrammatic representation of negative-pressure apparatus.

connected to the apparatus. A pressure of 40 to 50 centimetres of water is usually sufficient to promote drainage. Ten to fifteen millilitres of penicillin (strength 2000 units per millilitre) are injected through the rubber tubing into the thoracic cavity after each period of drainage.

Discontinuance of drainage and instillation is indicated when the discharge becomes serous or watery. If the fluid is free from Gram-positive cocci, both in smear and in culture, on three successive examinations made on separate days, the drainage tube is removed. A final injection of penicillin is made along the sinus, and a dry dressing is placed over the wound, which is left strictly alone for a week.

### Tuberculous Empyema.

Koplik regarded tuberculous empyema in children as the second stumbling stone in pædiatric practice, and as far as he could ascertain, this condition *per se* did not arise. In this series there was no case of tuberculous empyema.

Tudor Edwards states:[6] "All serous pleural effusions should be considered tuberculous unless proved otherwise."

Tuberculous pleural effusions may be primary or secondary to pulmonary disease.

It has been suggested that primary serous effusions (so called) may be due to an allergic manifestation following the lodgement of tubercle bacilli in the pleura. Another view is that there are in every case definite tuberculous foci, which have ruptured into the pleura, either subpleural foci in the lung or, more rarely, caseous subpleural lymphatic glands or tuberculous glands secondary to spinal abscess. According to this view primary tuberculous pleural effusion does not occur.

From the pathological, but more especially from the clinical point of view, it is essential to recognize two main groups: (i) cases of pleural effusion in which there has been a previous history of pulmonary disease; (ii) cases of pleural effusion in which there has been no clinical or radiological evidence of gross pulmonary disease.

These two groups may be further classified into subgroups according to types of effusion: (*a*) serous, in which demonstration of tubercle bacilli may be impossible; (*b*) sero-purulent or purulent, in which tubercle bacilli may be demonstrated in smears or by culture, for example, on Petragnani's medium, or by guinea-pig inoculation; (*c*) mixed, in which both tubercle bacilli and pyogenic organisms are present, most commonly pneumococci and streptococci.

Type (*c*) is much the most serious lesion, and often the tuberculous basis may be overlooked in the acute stage.

In the diagnosis, when the results of bacteriological examination of a purulent effusion have proved negative, tuberculosis should be suspected. When tubercle bacilli

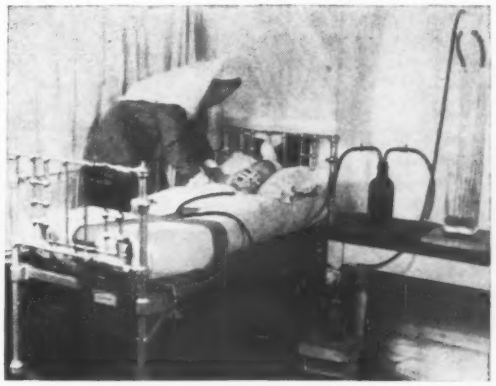

FIGURE III.
Photograph showing infant connected to negative-pressure apparatus.

are found, the diagnosis is obvious, but the finding of acid-fast bacilli can be misleading. Occasionally the examination of a pleural exudate may be valuable, an excess of lymphocytes over polymorphonuclear leucocytes suggesting tuberculosis.

Suspicion may be aroused by a swinging temperature in the presence of an adequately drained empyema, or in the later stage because of the chronicity of the condition. Removal of a portion of the thickened pleura for microscopic examination may help in the diagnosis.

The following case history is presented because of its interesting features (Figure IV). The condition was primarily diagnosed as tuberculous empyema, acid-fast bacilli being detected in the first fluid aspirated, and the patient was treated in accordance with this diagnosis. However, later extensive bacteriological examinations and guinea-pig inoculations did not establish a diagnosis of tuberculosis. The case graphically demonstrates the importance of the close liaison that is necessary between the physician, the bacteriologist and the surgeon in treating these patients.

M.S., a female, aged seven years, had no family history of tuberculosis and nothing relevant in her past history. She was first examined on February 16, 1948, having had a cough for three weeks. She began to have a high intermittent temperature and was treated for left lobar pneumonia with sulphadiazine given orally. Ten days later she coughed up a small quantity of frank blood and was admitted to hospital with signs of fluid at the base of the left lung and a provisional diagnosis of left *empyema thoracis*. On February 26 intramuscular administration of penicillin (20,000

units three-hourly) was commenced. On the following day 20 millilitres of thin straw-coloured fluid were aspirated, and 50,000 units of penicillin were injected into the pleural cavity. Bacteriological examination of this fluid revealed numerous pus cells, and an occasional acid-fast bacillus was seen in the smear stained by the Ziehl-Neelsen method. An examination of the blood at this stage revealed a neutrophile leucocytosis of 24,000 per cubic millimetre and a red cell count of 3,000,000 per cubic millimetre. A provisional diagnosis of tuberculous pleural effusion was made, and intramuscular injections of streptomycin (100,000 units every six hours) were commenced. Two blood transfusions were given over a period of seven days, and fluid was aspirated from the chest on two occasions. On March 23 a large quantity of greenish offensive pus was aspirated from the left pleural cavity, there was now pitting over the chest wall, and the child was extremely ill, having had a high intermittent temperature since her admission to hospital. An intercostal drain was inserted, the technique as described previously being used, and penicillin instillations were made

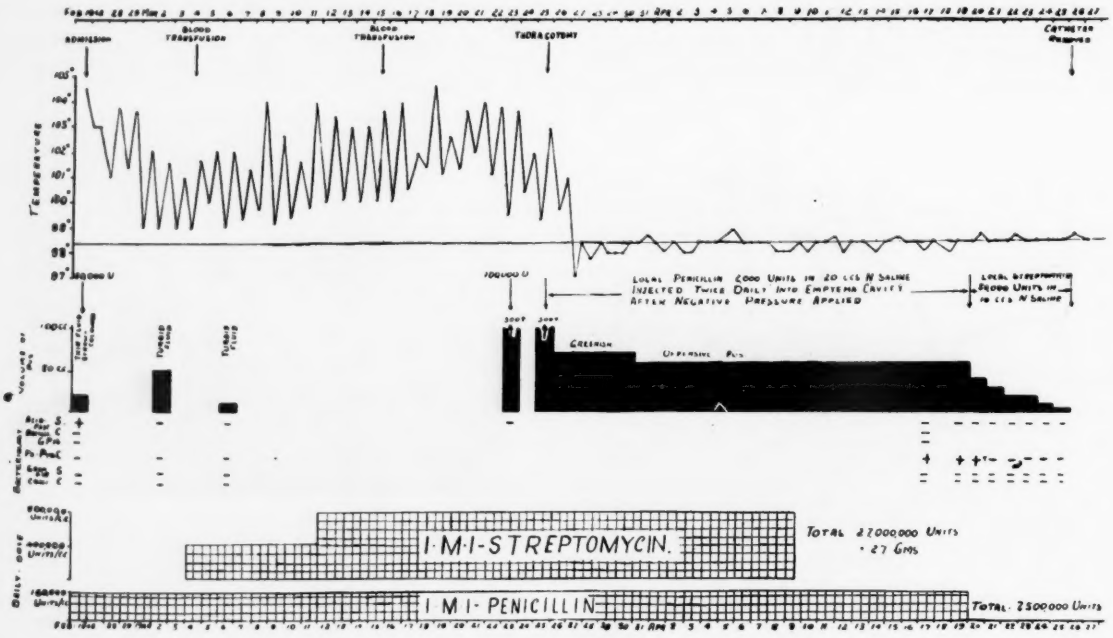


FIGURE IV.
Chart depicting temperature, quantitative pus estimations, bacteriology and treatment with streptomycin and penicillin in the case of M.S.

into the pleural cavity twice daily. From this time onwards the child continued to improve clinically. However, the amount of discharge remained excessive. On March 16 further bacteriological examination of the discharge was made, and it was now found that a profuse growth of *Pseudomonas pyocyanea* was obtained. The local use of penicillin injected into the pleural cavity was replaced by the local use of streptomycin, 50,000 units in 10 millilitres of normal saline. Within forty-eight hours no growth of the organism could be detected on smear or culture, and within four days the discharge had cleared up so that the tube could be removed

An X-ray examination of the chest showed no evidence of tuberculosis, and the tubercle bacillus was never identified by guinea-pig inoculations; also, the Mantoux reaction was absent with strengths of 1:1000 and 1:100. The child has since remained well, and recent X-ray films of the chest are normal in appearance.

### Summary.

1. The knowledge of the ætiology of empyema fifty years ago, as presented by Koplik, is discussed.

2. The bacteriological ætiology and mortality figures of a series of 43 cases of *empyema thoracis* which occurred at the Royal Alexandra Hospital for Children, Sydney, during the years 1942 to 1947, are presented.

3. A technique of treatment with intercostal drain, penicillin instillation and controlled negative-pressure drainage is discussed.

4. Tuberculous pleural effusion and empyema are rarely seen in children; a case is reported in which the patient was treated as having this condition though the diagnosis was never proved.

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## Reports of Cases.

### HYPERLIPÆMIA WITH SECONDARY XANTHOMATOSIS IN CHRONIC PANCREATITIS.

By LEO FLYNN and GEORGE HALL,
*Sydney.*

THE occurrence of chronic pancreatitis with hyperlipæmia and xanthomatosis was first published by Wijnhausen[1] (1921). Marchand[2] (1915), Joel[3] (1924) and Brunner[4] (1935) reported similar cases of acute and chronic pancreatitis. Chronic relapsing pancreatitis associated with hyperlipæmia in an eight-year-old boy was recently reported

by Collett and Kennedy.[5] This case which we are about to describe is, we believe, one of chronic pancreatic dysfunction with hyperlipæmia and eruptive xanthoma.

### Clinical Record.

Mr. F.D., aged forty-five years, first consulted one of us in March, 1947. He complained of lumps in the skin for five years and a dull boring pain in the arms, legs, hands and feet for four years. He stated that the lumps did not inconvenience him except for occasional soreness over pressure points, such as the buttocks and feet. Otherwise he felt quite well. He denied symptoms referable to any other systems at this time.

FIGURE I. Patient before treatment.

He stated that in 1941 he had been treated for "an ulcer" and had had abdominal pain and dyspepsia. He was not submitted to X-ray examination at the time. He responded to treatment after two to three months and lost his dyspeptic symptoms. However, twelve months later (July 12, 1942), while drinking a glass of ale, he suddenly developed very severe abdominal pain, was taken to hospital and was operated on urgently. The operation notes read as follows:

> Right paramedian incision — a little exudate found in the peritoneal cavity—looked almost purulent (3 fl. oz.). Omental fat looked very unhealthy—almost inflammatory. Stomach, duodenum and appendix normal. Gall bladder normal—few adhesions around gall bladder. Few areas suggesting early fat necrosis on peritoneum overlying pancreas.
>
> Diagnosis: Early pancreatitis.

The patient was very ill for four days with vomiting and hiccup, but after the institution of gastric drainage with a Ryle's tube and the intravenous administration of saline solution he improved and subsequently recovered. Glycosuria persisted during his stay in hospital.

Apart from this there was no history of previous illnesses. He stated that he had always done heavy manual work. He drank on an average two "schooners" of beer daily and smoked two ounces of tobacco weekly. He was not married. His father had died at the age of fifty-seven years of "stroke", his sister at the age of thirty-two years of a "clot of blood on the brain", his mother at the age of about fifty years, the cause being unknown, and his brother at the age of forty years of epilepsy after head injury. He was of the third generation from Austrian and French ancestors.

On examination he was a healthy-looking, middle-aged man with yellowish, tuberose nodules resembling xanthomata scattered over the body surface, excluding the face. The nodules varied in size from that of the head of a pin to that of a walnut, their distribution being most profuse over "pressure areas", particularly the buttocks, elbows and feet. (The patient stated that these nodules had appeared about five years previously, after the first bout of so-called ulcer pain and dyspepsia, but before the attack of acute pancreatitis. They had become much more profuse and generalized after the operation.) His blood pressure was 180 millimetres of mercury (systolic) and 110 millimetres (diastolic). There was thickening of the radial arteries. No other abnormalities were found on physical examination. The urine was normal.

The following results of special investigations were obtained. The blood serum was found to be milky, with a cholesterol content of 600 milligrammes *per centum*. The glucose tolerance test yielded a mild diabetic curve. X-ray examination of long bones and skull revealed no bony abnormality. The basal metabolic rate was normal.

The following report was made on a biopsy of a nodule from the skin:

> Sections of nodules show fibrous tissue capped with squamous epithelium. Numerous cells with "foamy" cytoplasm are present in the fibrous tissue.
>
> These cells resemble the foamy lipoid laden cells of xanthomata.
>
> There are acicular crystals (probably cholesterol) present in the interstitial tissue.

The urinary diastase content was two units per millilitre (a total of 3800 units in twenty-four hours). The following report was made on the examination of a stool:

> Soft stool. Microscopically meat fibres have undergone digestion. There are no oil globules, fatty acid crystals nor soap plaques in amounts to warrant a chemical examination of the stool.

### Differential Diagnosis.

The problem to be first decided in these cases is whether we are dealing with primary essential xanthomatosis, which is an heredo-familial constitutional disorder of the intracellular metabolism of reticulo-endothelial elements and histiocytes, or secondary xanthomatosis (the eruptive form of xanthoma), which is not a disease entity; it is more or less a symptom due to hyperlipæmia, which is also not a disease by itself.

The main points of difference, as outlined by Thannhauser,[6] are as follows.

(i) In contrast to the xanthomata of essential xanthomatosis, which do not change much, the eruptive form of xanthoma may disappear entirely if the hyperlipæmia disappears.

(ii) In essential xanthomatosis a milky serum usually is not found. Of the lipids, only cholesterol and lecithin are as a rule increased in amount. An increase in the amount of neutral fat is not a prerequisite for essential xanthomatosis and may not even occur at all. In secondary xanthomatosis, on the other hand, a milky serum is the outstanding sign. The neutral fat, the amount of which is enormously increased in these instances, causes the milky appearance of the serum.

(iii) There is a distinct histological difference between the xanthomata of essential xanthomatosis and those of secondary xanthomatosis. Foam cells are sparse in secondary xanthomata. There is no granulomatous tissue with the giant cells, cells which in the literature are sometimes called Touton cells. Extracellular fat deposits may be made visible in the gaps of the inflammatory connective tissue by appropriate staining. In essential xanthomatosis, however, large numbers of foam cells, scattered or congregated in nests, are conspicuous in the granulomatous tissue, which also contains giant (Touton) cells.

Now this case is, we believe, one of secondary xanthomatosis due to hyperlipæmia. We have firstly the rapid disappearance of the xanthomata with the disappearance of the hyperlipæmia (this occurred with treatment).

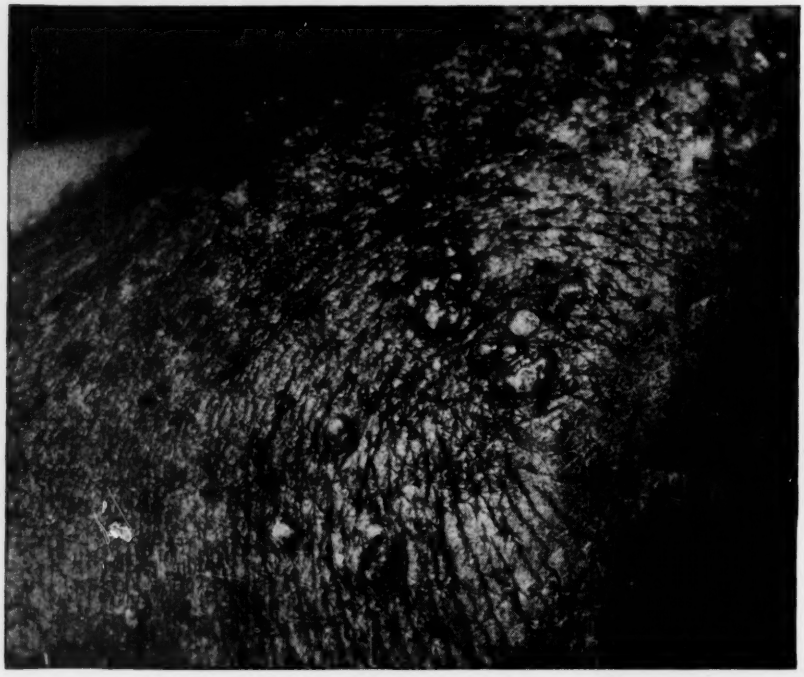

FIGURE II. Skin of elbow before treatment.

Secondly, we have the milky serum. Thirdly, the histological picture fits the description.

Now we must consider what mechanisms are producing the hyperlipæmia. There are three main conditions leading to such a picture:

1. Idiopathic (familial) hyperlipæmia with hepato-splenomegaly and secondary xanthomatosis: a rare condition which is excluded in this case by the history and the absence of splenomegaly and hepatomegaly.

2. Secondary xanthomatosis due to diabetic hyperlipæmia. In this, the commonest cause of secondary xanthomata due to hyperlipæmia, the condition results from a disturbance of carbohydrate disintegration in the liver. Fat, consequently, is transported and accumulated in this organ for combustion, and hyperlipæmia indirectly results. As soon as the liver is able to disintegrate carbohydrate again, the hyperlipæmia and the eruptive xanthomata, as well as the fattiness of the liver, disappear. The restoration of this function is achieved by the administration of insulin. This kind of hyperlipæmia, occurring in patients with severe diabetes, was frequently reported in the older literature, especially before the days of insulin.

3. Hyperlipæmia with secondary xanthomatosis in chronic pancreatitis. The clinical findings in cases of acute and chronic pancreatitis, as well as the experimental data obtained from studies on dogs by Dragstedt and his co-workers, show that the lack of an internal pancreatic secretion is responsible for the hyperlipæmia which sometimes occurs in cases of acute and chronic pancreatitis. This internal secretion is not identical with insulin. Dragstedt[7] has called it "the lipocaic factor". We believe that the mechanism of the production of the hyperlipæmia in this case is as just described. No glycosuria has been detected in this patient since he first came under our observation. Although the glucose tolerance curve shows decreased tolerance to glucose it is of a very mild nature. In addition, we have positive evidence (seen at operation) of the occurrence of pancreatitis. The disorder of fat metabolism appears completely to overshadow the disorder of carbohydrate metabolism in this case. We therefore believe this case to be one of chronic pancreatic dysfunction with hyperlipæmia and eruptive xanthoma.

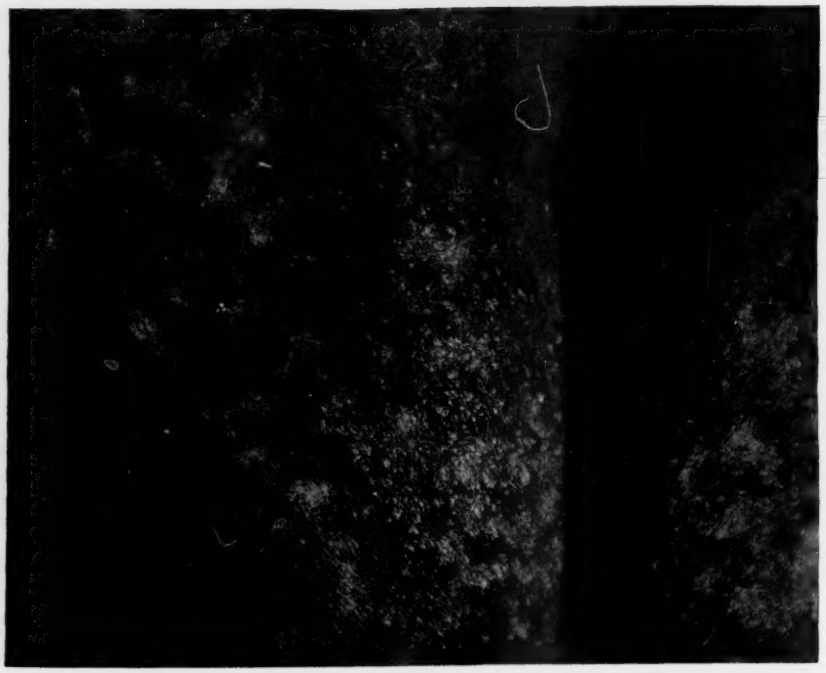

FIGURE III. Skin of buttocks before treatment.

### Treatment.

Treatment was begun with a 1200 Calorie diet of low fat content and soluble insulin, ten units per day. The patient experienced

severe local reactions, despite our changing the brands of insulin. Desensitization was suggested, but he refused further treatment with insulin.

Treatment was then begun in July, 1947, with *Thyroideum Siccum*, B.P., half a grain daily. This dosage was increased after one week to half a grain twice daily and subsequently increased each week by half a grain daily until the patient was having three grains daily. This dosage was maintained for five or six weeks and then dropped to one and a half grains daily and subsequently to one grain daily. The patient is still on a maintenance dose of one grain daily.

There was an appreciable diminution in the number of xanthomata and in the size of individual lesions after six weeks' treatment. Most of the xanthomata subsequently cleared completely, a few remaining on the feet and around the ankles. One month after the beginning of treatment the serum was clear, that is, it had lost the milky appearance and the serum cholesterol content had dropped from 600 milligrammes to 160 milligrammes *per centum*. There was also improvement in the result of the glucose tolerance test. The patient felt well, although his weight had decreased by almost a stone. A progress examination of the serum approximately six months after the beginning of treatment showed that the serum was again slightly milky and the serum cholesterol level had risen to 360 milligrammes *per centum*. The dosage of thyreoid was increased to two grains daily, and in approximately one month the serum was again clear and the serum cholesterol level had returned to normal (165 milligrammes *per centum*). The few remaining xanthomata also cleared up. The mode of action of the thyreoid is unknown. Unfortunately the pain in the limbs has persisted.

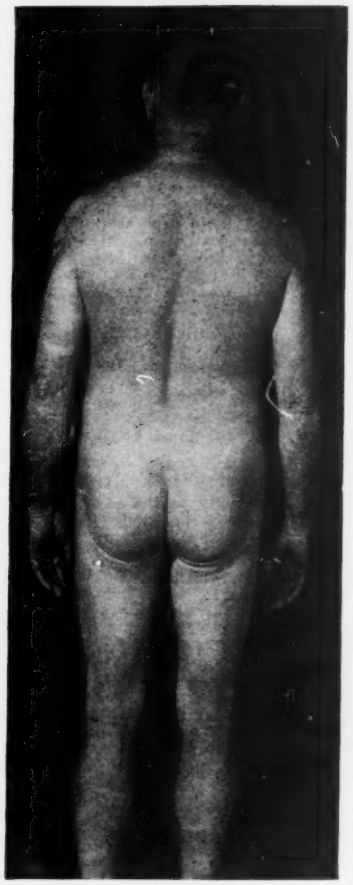

FIGURE IV. Patient after treatment.

### Conclusion.

This case was thought to be of special interest because (i) eruptive xanthomatosis with hyperlipæmia due to chronic pancreatic dysfunction is a rare condition, (ii) the presence of pancreatitis was proved at operation, (iii) the response to thyreoid therapy with regard to the disappearance of hyperlipæmia, cholesterolæmia and the resolution of xanthomata was dramatic. It is felt that this may have important implications in other fields of medicine.

Boas[6] and others are again paying much attention to abnormal cholesterol metabolism as one of the hereditary factors responsible for arteriosclerotic heart disease.

The burden of a disturbed cholesterol metabolism may possibly be eased by the administration of thyreoid substance. Lerman and White also have recently put forward this view.

### Summary.

A case of chronic pancreatitis with hyperlipæmia and xanthomatosis has been described.

The essential points of difference between primary essential xanthomatosis and secondary xanthomatosis (eruptive form of xanthoma) have been outlined, and differentiation has been made between these conditions and other conditions manifesting hyperlipæmia and secondary xanthomatosis.

The dramatic response in this case to thyreoid therapy, after dietetic treatment had failed, is emphasized.

### Acknowledgement.

Acknowledgement is made with gratitude to Dr. H. Selle, medical superintendent of the Royal Prince Alfred Hospital, for access to hospital records for operation notes; to Dr. E. L. Morgan, of the Public Health Department, for the histological report on the section of a cutaneous nodule; to Dr. J. Garvan, of Lewisham Hospital, for other pathological reports; to Mr. Appleby, of the clinical photography department of Sydney Hospital, and to the clinical photography department of Saint Vincent's Hospital, for the photographs.

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(3) E. Joël: *"Zur Klinik der Lipämie"*, *Zeitschrift für klinische Medizin*, Volume C, 1924, page 46; quoted by S. J. Thannhauser, *loco citato*.

(4) W. Brunner: *"Beitrag zur pankreatogenen Lipämie"*, *Klinische Wochenschrift*, Volume XIV, 1935, page 1853; quoted by S. J. Thannhauser, *loco citato*.

(5) R. W. Collett and R. L. J. Kennedy: *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XXIII, 1948, page 158.

(6) S. J. Thannhauser: "Lipidoses. Diseases of the Cellular Lipid Metabolism", 1940, page 179.

(7) L. R. G. Dragstedt, J. Van Prohaska and H. P. Harms: "Observations on a Substance in the Pancreas (Fat Metabolizing Hormone) which Permits Survival and Prevents Liver Changes in Depancreatized Dogs", *The American Journal of Physiology*, Volume CXVII, 1936, pages 166 and 175.

(8) E. P. Boas, A. D. Parets and D. Adlersberg: "Hereditary Disturbance of Cholesterol Metabolism: A Factor in the Genesis of Atherosclerosis", *American Heart Journal*, Volume XXXV, 1948, page 611.

## ACTINOMYCOSIS OF OR SURROUNDING AN OVARY.

By CUTHBERT C. FINLAY AND JOHN GARVAN,

*Marrickville District Hospital,*
*New South Wales.*

INTRAPERITONEAL ACTINOMYCOSIS has been reported, but a primary intraperitoneal pelvic invasion must be very rare.

### Clinical Record.

At 10 a.m. on February 5, 1946, I was called to see a patient, Miss L., aged twenty-two years, at her home. On general inspection of the patient at the time, a perfect picture was presented of a person suffering from a recently ruptured ectopic gestation. However, the history was as follows. She had had pain around the umbilicus for five days and nausea with vomiting for two days. No urinary symptoms were present. The bowels were acting regularly. Her last menstrual period had commenced on January 7, 1946. On examination the patient was an extremely pale girl. The heart and chest were normal. Her temperature was 99° F. and her pulse rate 120 per minute. Examination of the abdomen revealed a definite tumour in the right lower quadrant arising from the pelvis. Vaginal examination was of little value as one

finger only was admitted with difficulty. Her admission to Marrickville District Hospital was arranged forthwith. Blood examination revealed a total red blood cell count of 2,600,000 per cubic millimetre, a hæmoglobin value of 50%, a colour index of 0·96 and a total white blood cell count of 11,000 per cubic millimetre. The provisional diagnosis was organized hæmorrhage from the right ovary.

On February 7, 1946, operation was performed. Through a mid-line incision a nodular circular tumour, measuring five by four inches, adherent to bowel and surrounding viscera, and extending into the pelvis and the region of the right ovary was removed. It was noted that pus appeared to be present between the nodules of the tumour. There was no evidence of metastases within the abdomen, and one was at a loss to determine the pathological nature of the tumour removed. Sulphanilamide powder was placed in the operation area and a specimen of pus was collected; the report, dated February 9, 1946, stated that culture revealed a mild growth of Gram-negative coliform bacilli. The tumour was forwarded to the Board of Health, Sydney, for examination.

On February 9, 1946, a blood transfusion produced a rather severe reaction. On February 11 the red blood cells numbered 3,030,000 per cubic millimetre, the hæmoglobin value was 36% and the white cells numbered 14,000 per cubic millimetre. The white cells had increased in number to 15,600 per cubic millimetre by February 18, 1946, and penicillin therapy was commenced, 150,000 units being given every three hours. Her temperature in the evening was about 101° F. for some weeks. Penicillin administration was stopped on March 18, 1946.

On February 15, 1946, the following pathological report was received from the Board of Health, Sydney:

> Section shows fibrous tissue containing extensive abscess formation in which numerous actinomycotic granules are present.

The operation wound healed by first intention, and the patient was taken by ambulance to the Royal Prince Alfred Hospital, Sydney (and return), for three treatments of deep X-ray therapy, but the wound subsequently broke down with the copious discharge of pus.

Pus from the wound, examined on March 13, 1946, contained numerous pus cells; no actinomyces were seen. Examination of a smear revealed Gram-negative bacilli and Gram-positive diplococci. Culture produced an overgrowth of Gram-negative bacilli. On May 1, 1946, the pus contained numerous pus cells; no actinomyces were seen.

During the months to July there was a continual fall in the patient's hæmoglobin value despite iron and liver therapy *et cetera*. A further transfusion was given on July 6, 1946, with a severe reaction again. The patient was given further massive dosages of penicillin, sulphadiazine, and iodide of potassium. The wound healed a fortnight before the patient's discharge from hospital on September 30, 1946. She put on over two stone in weight and returned to work as a packer for twelve months.

On May 24, 1948, the patient was readmitted to hospital. She had not been well for the past six months, and six weeks before coming to hospital she had begun to feel pain in her right ribs and the left side of her chest. About two weeks later she developed a spasmodic cough; this disturbed her sleep but was not productive. There had been considerable loss of weight and development of pallor; nausea and vomiting had occurred on and off for months. On examination the patient appeared to be some years older than she was, with drawn, sunken facies, poor nutrition, extreme pallor and a "toxic" appearance. Her blood pressure was 115 millimetres of mercury (systolic) and 75 millimetres (diastolic). Her liver was enlarged, being palpable two inches below the right costal margin. Examination of the heart revealed tachycardia, but no other abnormality. The hæmoglobin value was 5·2 grammes *per centum* (36%) and the leucocytes numbered 37,000 per cubic millimetre, being made up of neutrophile cells 88%, lymphocytes 10% and monocytes 2%. A blood transfusion produced a reaction similar to that of two years previously.

On May 28, 1948, the hæmoglobin value was 8·7 grammes *per centum* (60%), and the leucocytes numbered 27,400 per cubic millimetre. After consultation with Dr. A. W. Morrow, honorary consultant physician to Marrickville District Hospital, and on his recommendation, administration was commenced of 200,000 Oxford units of penicillin every three hours *plus* sulphadiazine. On June 2, 1948, a severe papular eruption developed, sulphadiazine was suspended and "Benadryl" was given for two days; the eruption subsided. Paracentesis of the thorax on both sides and through the diaphragm was unproductive. The patient coughed up blood on June 6 and again on June 14, 1948; she was given two millilitres of "Neolepate" twice daily by intramuscular injection. On June 18, 1948, the condition of the chest was unchanged; the liver and spleen were larger. The nocturnal temperature was 102° to 103° F. The patient complained bitterly about the penicillin injections and they were suspended. On June 20, 1948, paracentesis of the left side of the thorax produced a strange coloured fluid only. A further blood transfusion was given, the hæmoglobin value being 50% and the total leucocyte count 18,900 per cubic millimetre.

The following X-ray reports were received.

> May 27, 1948: Actinomycosis unlikely; suggest either miliary T.B. or acute bronchiolitis, probably the latter.
>
> June 8, 1948: Patchy consolidation of both lung fields with a little thickened pleura and ? fluid at left base. Radiologically the differential diagnoses are numerous. But actinomycosis could give a bronchopneumonic picture such as this, though it is more usual for it to be grouped together in large areas with abscess cavities. I think T.B. can be excluded.

The patient died on July 16, 1948.

### Post-Mortem Examination.

A post-mortem examination was conducted and the following is the report of one of us (J.G.), part-time pathologist to Marrickville District Hospital.

> July 16, 1948: Post-mortem was performed twelve hours after death.
>
> The body was that of a young adult female. There was gross distension of the abdomen and emaciation of the subcutaneous tissues. In the anterior abdominal wall there was a mid-line scar with sinus formation.
>
> *Thoracic Contents.* The pleural layers were bound together by dense adhesions, which were separated only with great difficulty. The lungs were completely consolidated. The cut surfaces of the lungs were studded with numerous small abscesses. These varied in size from two to five millimetres and were greyish-yellow in colour. They did not show any cavity formation. The intervening lung tissue was hepatized and greyish in colour. Microscopically the lung showed the abscesses to consist of a central zone of suppuration with peripheral granulation tissue. Gram stain of the material showed the typical tissue colony of actinomycosis. There is a superadded pneumonitis and bronchitis. The heart was involved in an extensive fibrinous pericarditis, otherwise it showed no significant change.
>
> *The Abdomen.* The peritoneal cavity contained about a pint of amber fluid. There was a generalized peritonitis with extensive adhesions of the greater omentum to the coils of the small intestine. The sinus in the abdominal wall was associated with a firm necrotic mass situated in the brim of the pelvis in the anatomical position of the right ovary. Microscopically this mass showed granulation tissue with foci of suppuration and numerous colonies of actinomycosis. Its structure is completely disorganized and could not be identified as any definite organ. An interesting feature was the extensive leash of blood vessels formed in the pelvis in relation to this mass. The uterus was small but otherwise appeared normal. The liver was greatly enlarged, the superior surface being involved in a subphrenic abscess occupying about one-third of the organ and occupying the upper half of the right lobe. Sections of the liver show multiple abscesses with suppuration and numerous granules of actinomycosis. The pus from the liver was examined bacteriologically. The streptothrix was an anaerobe and non-acid fast and probably of the Wolff-Israel type. Microscopically the pus showed typical "sulphur granule" formation. The spleen was enlarged and firm. Microscopically it showed marked chronic venous congestion. The kidneys are smaller

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than normal, with reduction in the width of the cortex. Sections of the kidney show extensive chronic suppurative nephritis, but no actinomycotic granules could be seen.

*Summary.* The post-mortem findings are those of disseminated actinomycosis. The history of the case suggests that the disease originated in the pelvis near the position of the right ovary.

# Reviews.

## A YEAR BOOK OF PÆDIATRICS.

"THE 1948 YEAR BOOK OF PEDIATRICS" is the first volume of this member of the Year Book series to be edited by Henry G. Poncher, who is professor and head of the department of pediatrics in the University of Illinois College of Medicine, Chicago.[1] Isac A. Abt, who had previously edited the book for forty-six years, remains as editor emeritus. The new editor states that his policy will be to select, for the most part, articles dealing with practical aspects of pædiatrics (particularly diagnosis and treatment). He believes that a large number of Year Book readers are general practitioners, who are responsible for the bulk of child care. Since "the practice of tomorrow depends on the vision of those charged with the care of children", he has included "articles which broaden the reader's perspective and give a sound foundation in physiology and pathology on which to base astute diagnostic reasoning and rational treatment". The arrangement of the material is practically the same as in the previous volume, the only notable change being the addition of a section on tuberculosis; this section is largely taken up with reports on the use of "B.C.G." from America, Britain and Scandinavia and on treatment with antibiotic and chemotherapeutic agents. Here, and throughout the volume, papers by Continental authors are prominent and they appear to be of a high order. An example is a study from Stockholm on heart arrhythmias in children, which the editor abstracts at some length and particularly commends. An interesting and well-illustrated study on the physiology of the neonatal nervous system comes from France. A series of papers on poliomyelitis have all been gathered from the United States where this disease seems to have assumed considerable importance. There is a comprehensive selection of papers on the rapidly progressing subject of congenital cardiac anomalies and their treatment. The section on therapeutics is intended to be essentially practical and should be found helpful. Papers by Australian authors include F. M. Burnet's Edward Stirling Lecture on "The Basis of Allergic Disease" and a survey of the effects of maternal rubella by P. R. Patrick, of Brisbane. The general make-up of the volume conforms to the high standard we expect of this series.

## RECENT ADVANCES IN RESPIRATORY TUBERCULOSIS.

THE fourth edition of "Recent Advances in Respiratory Tuberculosis" by F. Heaf and N. L. Rusby is so numbered because it succeeds the third edition of "Recent Advances in Pulmonary Tuberculosis" by the late L. S. T. Burrell; but it is a bird of very different plumage that has arisen from the ashes of the phœnix's nest.[2] Radical changes might be expected in such a book, not only because it reappears after a lapse of eleven years, but because during that time we have come to live in an entirely new era of the control of tuberculosis. In the anatomy of the lung and in the morbid anatomy and pathology of tuberculosis our knowledge has undergone thorough revision; in epidemiology, case finding methods have become much less haphazard; and in diagnosis the invention of mass miniature X-ray technique has simplified the examination of large numbers of people. In the prevention of disease the reintroduction of the "B.C.G." has shown promise; in the general management of patients treatment has become less stereotyped and less restrictive; in medication the application of sulphones and antibiotics has revived new hope that a *therapia sterilisans magna* may be not far off. In tuberculosis in pregnancy the indications for abortion have narrowed and become more related to social and economic considerations. The surgery of tuberculosis is becoming almost as much a science as an art: the major interventions are no longer regarded as a gamble, a year or two of an invalid's life against health and freedom. A new social science called rehabilitation has emerged and many forms of diversional, occupational and vocational therapy are now extensively practised and in some places organized on a very large scale. Administrators of public health services have given much thought to achieving a proper coordination and balance between treatment, prevention and rehabilitation and there has been increasing recognition of these matters as a public responsibility. In the fourteen chapters of this book all these recent advances and many others are thoroughly explored. The chapters in the former edition on climate and light and on sanatorium régime have been reduced to paragraphs.

The authors have reviewed the modern literature on respiratory tuberculosis soberly and have not missed much of importance. There is little with which to find fault. The sections on statistics and classification show, if they show anything, the very limited value of statistics and classification in respiratory tuberculosis. The section on tuberculin testing is somewhat confused and important recent advances in this field, which concern the development and use of tests made with a single injection of tuberculin, are ignored. The section on recovery of the tubercle bacillus makes no reference to the use of fluorescent stains which has so simplified the task of examining large numbers of slides. The reference to Petragnani's medium (that all pathologists do not yet agree that it is as accurate as guinea-pig inoculation) and the absence of reference to other modern culture media very widely used indicate an over-cautious assessment by the authors of important advances in bacteriology. Finally, there is no reference to the economics of pulmonary tuberculosis, and to the methods which are growing up for harnessing public interest and goodwill to the campaign against this disease.

## CLINICAL LABORATORY METHODS AND DIAGNOSIS.

THE fourth edition of "Clinical Laboratory Methods and Diagnosis", by R. B. H. Gradwohl, comprises three weighty volumes with a total of 3148 pages.[1] The first volume contains chapters on urine analysis, blood chemistry, hæmatology, blood groups and transfusion, gastric analysis, examination of puncture fluids and fæces and "special tests". Volume II includes chapters on "Bacteriologic Applications to Clinical Diagnosis", serology, post-mortem examinations, tissue cutting and staining, preparation of museum specimens, toxicologic technique, "Detection of Crime by Laboratory Methods", basal metabolism, electrocardiography and a list of minimum supplies, equipment and reagents for pathological laboratories. The third volume, dealing with parasitology and tropical medicine, has been written jointly by Dr. Gradwohl and Dr. Pedro Kouri.

Dr. Gradwohl is the director of the Gradwohl laboratories and Gradwohl school of laboratory technique, pathologist to Christian Hospital, and Director of the Research Laboratory of the St. Louis Metropolitan Police Department. He has been engaged in clinical pathology for more than forty years, and in the compilation of the fourth edition of his book he has been assisted by many of his colleagues. The result is a monumental, encyclopædic compendium—an "omnibus" of clinical pathology in the widest possible sense of that term. It is unusual, for example, to find chapters on electrocardiography and on the detection of crime by laboratory methods in standard works of clinical pathology. Dr. Gradwohl's book, however, is probably primarily intended for the use of technicians-in-training in the Gradwohl School, and possibly all these varying subjects are included in their course. Simple, almost elementary accounts of the metric system, the use of the microscope, the pH of solutions and so on are included; possibly many trainees come to the school with very little previous scientific training. At the same time, all the most modern methods used in clinical labora-

[1] "The 1948 Year Book of Pediatrics", edited by Henry G. Poncher, M.D., and Isaac A. Abt, M.D.; 1948. Chicago: The Year Book Publishers Incorporated. 7" × 4½", pp. 548, with 167 illustrations. Price: $4.50.

[2] "Recent Advances in Respiratory Tuberculosis", edited by F. Heaf, M.A., M.D., F.R.C.P., and N. Lloyd Rusby, M.A., D.M., F.R.C.P.; Fourth Edition; 1948. London: J. and A. Churchill, Limited. 8" × 5", pp. 307, with illustrations. Price: 21s.

[1] "Clinical Laboratory Methods and Diagnosis": Volume I and II, by R. B. H. Gradwohl, M.D., D.Sc., F.R.S.T.M. and H. (London); pp. 3742; Volume III, "Parasitology and Tropical Medicine", by R. B. H. Gradwohl, M.D., D.Sc., F.R.S.T.M. and H. (London), and Dr. Pedro Kouri, pp. 876. Fourth Edition; 1948, with illustrations. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 6¾". Price: £15.

tories are included, and the treatment of many subjects is most comprehensive and complete, though always written from a practical, technical, sometimes almost popular point of view. The book abounds with useful "tips" and illustrations of apparatus and gadgets of all kinds, usually with the brand and name and address of the manufacturer given in a footnote. Many methods which depend on proprietary preparations are described, often without reference to the basic scientific principles involved. There is a curious unevenness and lack of discrimination in the space allotted to various subjects. The first two volumes would have benefited by good, clear-cut editing; the style is often rambling and discursive; information is duplicated in places. For all its size, this is not a first-rate text-book, which is a pity, for an immense amount of work has gone into its production.

It is not growing like a tree
In bulk doth make man better be.

And the same may be said of books.

The subject of clinical pathology is indeed a vast one, so vast that one would prefer on the whole to buy several books by different authors rather than a compendium of this type. Perhaps it is difficult to assess the true value of these books without an intimate knowledge of the medical laboratories in the United States where there is evidently a demand for a work such as this.

## PRINCIPLES GOVERNING EYE OPERATING ROOM PROCEDURES.

"PRINCIPLES GOVERNING EYE OPERATING ROOM PROCEDURES" is an authoritative book for ophthalmic surgeons and their nurses.[1] The author has been for many years supervisor of the eye operating room at the New York Eye and Ear Infirmary. She therefore has not only seen many famous surgeons, but also has trained many nurses. Most surgeons would find the instruments provided for any one operation excessive, but by altering the lists to his own requirements he would provide his nurse with a valuable guide. The 32 illustrations show mainly the set-ups for various operations. These provide a ready means of checking the instruments required for a particular operation. This book should be possessed by the surgeon or the sister in charge of any ophthalmic department.

## A YEAR BOOK OF ORTHOPÆDICS AND TRAUMATIC SURGERY.

THE editor of "The 1948 Year Book of Orthopedics and Traumatic Surgery", Edward L. Compere, has ranged widely in choosing material for this volume.[2] British and European literature is particularly well represented and Australian papers abstracted include one by J. R. S. Lahz on tennis elbow and one by F. H. McC. Callow on hand injuries. The latter appears in a new section devoted exclusively to the hand, whose peculiar and important problems the editor has wisely felt warrant separate consideration. Other new sections are concerned with the epiphyses and with plastic surgery of the trunk and extremities. For the rest the arrangement is the same as in the previous volume of this particular "Year Book". Following a deliberate policy of keeping up to date the reader's knowledge of the basic sciences, the editor states that he has included abstracts dealing primarily with the anatomy, physiology and pathology of the bones, joints and muscles of the spine and extremities, with the effects of drugs, vitamins or hormones on the growth, health or repair of orthopædic structures, and with new laboratory techniques or biochemical tests which may be of value to the orthopædic surgeon. It should not be thought, however, that the book will be of interest only to orthopædic surgeons; the general practitioner, the general and the plastic surgeon and the physician could with profit avail themselves of at least part of it. This book, like the other "Practical Medicine Year Books", is a useful volume made yet more acceptable by its handy size and excellent production.

[1] "Principles Governing Eye Operating Room Procedures", by Emma I. Clevenger, R.N.; 1948. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¼" × 6", pp. 218, with illustrations. Price: 4s.

[2] "The 1948 Year Book of Orthopedics and Traumatic Surgery", edited by Edward L. Compere, M.D., F.A.C.S.; 1948. Chicago: The Year Book Publishers Incorporated. 7" × 4¼", pp. 478, with 261 illustrations. Price: $5.00.

## Books Received.

*[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]*

"Campbell's Operative Orthopedics", edited by J. S. Speed, M.D., Associate Editor, Hugh Smith, M.D.; Second Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 6¾". Volume I, pp. 912, with 573 illustrations; Volume II, pp. 900, with 568 illustrations, two of which are coloured. Price: £11 5s.

The work of eleven collaborators, most of whom are members of the same clinic and faculty.

"The Practice of Refraction", by Sir Steward Duke-Elder, K.C.V.O., M.A., D.Sc. (St. And.), Ph.D. (London), M.D., F.R.C.S., Hon. D.Sc. (North Western); Fifth Edition; 1949. London: J. and A. Churchill, Limited. 8" × 5¼", pp. 336, with 216 illustrations. Price: 18s.

Intended for students and practitioners.

"Blood Transfusion", by Elmer I. DeGowin, M.D., Robert C. Hardin, M.D., and John B. Alsever, M.D.; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" × 6", pp. 608, with 200 illustrations. Price: 63s.

Intended for practitioners, students and technicians.

"Obstetric Analgesia and Anesthesia: Their Effects upon Labour and the Child", by Franklin F. Snyder, M.D.; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" × 5¾", pp. 420, with 114 illustrations. Price: 45s. 6d.

Based on the author's clinical and laboratory experience and on a review of the literature.

"Clinical Aspects and Treatment of Surgical Infections", by Frank Lamont Meleney, M.D., F.A.C.S., with a foreword by Allen O. Whipple, M.D.; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9½" × 6¼", pp. 760, with 278 illustrations. Price: 84s.

Intended for surgeons and general practitioners.

"Introduction to the Szondi Test: Theory and Practice", by Susan Deri, with a foreword by Dr. Lipot Szondi; 1949. New York: Grune and Stratton. 8½" × 5¼", pp. 372. Price $5.00.

Deals with a method of personality investigations.

"Psychodiagnosis: An Introduction to Tests in the Clinical Practice of Psychodynamics", by Saul Rosenzweig, Ph.D., with the collaboration of Kate Levine Kogan, Ph.D.; 1949. New York: Grune and Stratton. 8½" × 5¼", pp. 398. Price: $5.00.

Intended chiefly for psychiatrists.

"Operating Room Technique", by Edythe Louise Alexander, R.N.; Second Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9¾" × 6½", pp. 772, with 668 illustrations. Price: 75s.

Intended for members of the nursing staff.

"Clinical Orthoptics Diagnosis and Treatment", by Mary Everist Kramer, edited by Ernest A. W. Sheppard, M.D., and Louisa Wells-Kramer; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9½" × 6½", pp. 480, with 147 illustrations. Price: 60s.

Intended as a reference book on principles of the subject with information on their practical application.

"The Medical Clinics of North America" (issued every two months); 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Chicago Number. 8¾" × 5¾", pp. 308. Price: £4 12s. 6d. (paper binding) and £5 10s. (cloth binding) per clinic year.

Nineteen articles comprising a symposium on diseases of the skin—a Chicago number.

"Introduction to Physiological and Pathological Chemistry: With Laboratory Experiments", by L. Earle Arnow, Ph.G., B.S., Ph.D., M.B., M.D., with an Introduction by Katharine J. Densford, R.N., B.A., M.A., D.Sc.; Third Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" × 5½", pp. 604, with 144 illustrations. Price: 30s.

Intended for undergraduate students.

"Clinical Case-Taking; Guides for the Study of Patients: History-Taking and Physical Examination or Semiology of Diseases in the Various Systems", by George R. Herrmann, M.D., Ph.D.; Fourth Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" × 5½", pp. 250, with few illustrations. Price: 26s. 6d.

Intended as a manual for actual ward and bedside practice.

The Medical Journal of Australia

SATURDAY, JUNE 25, 1949.

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## MEDICINE AND ATOMIC WARFARE.

WITH the preparation and explosion of the first atom bomb man may truly be said to have entered a new era in his history. Other events in earlier days have probably called for remarks of a similar kind; but with the elaboration of the atomic bomb such tremendous sources of energy have been tapped and so far-reaching a weapon of destruction has been forged, that the imagination may be said to quail before them. The atom bomb was not the outcome of work extending only over a year or two; it was the result of patient investigation extending over many years. In his book "Atomic Energy in the Coming Era", David Dietz, a well-known American writer, summarizes[1] the history of atom smashing up to the isolation of "uranium 235" as follows: In 1905 Einstein wrote the equation for the transformation of matter into energy. In 1906 Rutherford established the nuclear theory of atomic structure. In 1919 Rutherford smashed the first atom, bombarding nitrogen with $\alpha$ particles and obtaining hydrogen. In 1929 the first giant atom smashers were built, including the Van de Graaff generator and the Laurence cyclotron. In 1932 Cockcroft and Walton achieved the first nuclear transformation with an accelerated stream of protons and verified the Einstein equation. They caused lithium and hydrogen to react to form helium. In 1932 also Chadwick verified the existence of the neutron and in the same year Urey discovered double weight hydrogen and "heavy water". In 1933 Anderson discovered the positron. In 1934 Irene Curie and F. Joliot discovered artificial radioactivity and Fermi invented the "slow neutron" technique. In 1939 uranium fission was discovered and in 1940 the first sample of uranium 235 was isolated. When we say that sources of energy have been tapped and powerful weapons of destruction have been forged we do not imply that the investigations of nuclear physics have been carried on from the early days purely that these weapons may be fashioned. The discoveries of science may be used for good or ill, as adjuvants to life or as means for its destruction. A great deal might be written on this aspect of the subject, but the fact remains that atom bombs have been used in warfare and will possibly be used again. This carries a challenge to the profession of medicine whose members have as part of their duty the care and well-being of combatants and non-combatants in war and the healing of those who are injured during its progress. Although no details have been given, it is known that work is being carried out on equipment for atom bomb warfare. At the same time little has been heard of measures that may be used in an effort to protect the people in areas that are attacked. L. O. Jacobson, R. S. Stone and T. G. Allen[1] in an article on "Physicians in An Atomic War" state that Americans would be hardly much better off to cope with an atomic bomb attack on one of their major cities than the Japanese were at Nagasaki. In these circumstances it is important to note that in the United States information has been published which should help medical men and women to learn enough about atomic bombs and their use to enable them to take an intelligent interest in defence. Rear-Admiral L. L. Strauss has written on the medical profession and atomic energy, and in the same journal[2] Shields Warren has discussed the medical programme of the Atomic Energy Commission. Attention should also be drawn to a series of ten papers prepared by the Special Projects Division of the Office of the Surgeon-General of the United States and based on material presented in courses on medical aspects of atomic explosion. These papers were published in *The Bulletin of the United States Army Medical Department* and have been reprinted.[3]

Any discussion on the medical aspects of atomic bombing should ideally start with a description of the atom and its structure—the negatively charged electrons speeding around the nucleus which carries a positive charge of electricity. The structure of the nucleus with its protons and neutrons would need to be described, together with their relationship to electrons. This would be followed by an account of what splitting of the atom means and of the forces released when this occurs. For present purposes, however, it is not necessary to attempt this task. It is important to remember that the medical effects of atomic bomb explosions may be divided into three categories: trauma, burns and radiation injury. Trauma is caused by blast or by flying debris. It is pointed out in article III of the ten named that at the Japanese explosions no one was closer than several hundred metres to the bomb. The explosion did not have the trip-hammer effect of high explosive, but was rather like a sudden violent gust of air that lasted for a brief but appreciable period. Japanese medical observers on the spot found no patients with direct damage to internal organs caused by blast; and necropsy in the early cases showed no evidence of blast damage to the lungs. Many persons reported having lost conscious-

[1] "Atomic Energy in the Coming Era", by David Dietz; 1945. Sydney: Angus and Robertson, Limited; New York: Mead and Company. 7½" × 5", pp. 186, with illustrations. Price: 12s. 6d.

[1] *The Journal of the American Medical Association*, January 15, 1949.

[2] *The Journal of the American Medical Association*, December 25, 1948.

[3] I, "Introduction to Nuclear Physics"; II, "Biological Effects of Nuclear Radiation from an Atomic Explosion"; III, "Medical Effects of Atomic Explosion"; *The Journal of the Indiana State Medical Association*, June, 1948. IV, "Evaluation of the Five Atomic Explosions"; V, "Fundamentals of Radiation Pathology"; *ibidem*, July, 1948. VI, "Pathologic Anatomy of Radiation Effects of Atomic Explosion"; VII, "Detection of Overexposure to Ionizing Radiation"; VIII "Public Health Aspects of Atomic Explosion"; *ibidem*, August, 1948. IX, "Essentials of Instrumentation"; X, "Protection Against Atomic Bomb"; *ibidem*, September, 1948.

ness temporarily with no history of direct trauma to the head. Windows were broken about twenty kilometres away and the radius of complete collapse of wooden buildings was about 2·4 kilometres, almost symmetrically distributed about the centre. The incidence of mechanical injury was about 60% between 500 and 1250 metres. Beyond a distance of 2700 metres the incidence of mechanical injury began to fall off rapidly, but even at a distance of 4500 metres it was 14%. The glass windows in heavy buildings caused a high incidence of injury. Exactly how much of the total mortality was caused by trauma will never be known on account of the extensive fires which spread within a half-hour of the occurrence of the blast. The types of injury in a group of patients in a military hospital comprised fractures, contusions and lacerations. The burns that occurred were flash burns and flame burns. The latter were relatively rare, because it took some time, perhaps an hour, for the fires that were started after the blast to spread within the city. The result was that those who did not escape were burned to death. Some interesting statements are made about the effects of ultra-violet rays, visible light and infra-red rays. Only surfaces directly exposed to the rays were affected by them. The wood of dark coloured telegraph poles was superficially carbonized at about 3000 metres from the centre. A temperature of 4000° C. acting for 0·5 second is necessary to produce a second degree burn. Burns were of no significance beyond 4000 metres and beyond 3000 metres few burns required treatment. Of the deaths attributed to burns, 53% occurred within the first week and 75% within two weeks. The interval of time that elapsed before the appearance of burns and blisters varied directly with the distance from the explosion. Certain features of the burns suggested that specific wave-lengths, probably in the ultra-violet range, were responsible. It was also noted that clothing had a protective effect depending on a series of interrelated factors; these included distance, colour and shade, tightness and thickness and number of layers. The observations recorded followed the explosion of the two bombs over the two Japanese cities of Hiroshima and Nagasaki. The second was more powerful than the first and it is probable that any missiles of this kind that are used in the future will be still more powerful and devastating. The observations must be accepted then in a qualitative rather than a quantitative sense. Radiation burns have not been mentioned. Jacobson, Stone and Allen point out that no exact or reliable information is available about the amount of total radiation that the body will stand. They give rough indications showing the effects of different doses of radiation from 50*r* to 200*r* on the one hand to doses above 600*r* on the other. With doses above 600*r*, on the basis of present knowledge, only a relatively few persons would survive, even with the best of medical care. Space does not permit extended reference to the effects on different parts of the body observed in Japan. These are well set out and a clinical syndrome in radiation sickness is described as affecting three groups of patients—those who died within the first two weeks, those who died in the third, fourth, fifth or sixth weeks or survived severe symptoms, and those who died of extreme emaciation after a prolonged illness. It is or should be reassuring to read a declaration by Jacobson, Stone and Allen (they are qualified by experience to deal with this subject) that research directed towards the medical and biological effects of radiation has been given great emphasis. When we remember their statement about the present inability of America to cope with the atom bomb, we realize how much remains to be done.

On the present basis of knowledge some general statements can be made about the organization of large cities to meet attacks with atom bombs. This is done by Jacobson and his two co-workers. Before their recommendations are stated, however, it will be useful to record their opinions on the fate of bombed cities. It must be emphasized again that their observations are made in the light of experiences with the bombs used at Hiroshima and Nagasaki, and that the future devastation may well be much worse than it was on the two occasions mentioned. They think it probable that a large fraction (possibly one-third) of the population of a bombed city will be killed outright or will die in days to weeks, no matter how soon they are brought under medical care. Another third will survive if medical care is quickly or adequately provided, and the remaining third will have a fair chance of surviving without medical aid unless epidemics break out or unless disruption of transportation and other basic facilities makes it impossible to provide food, water and shelter. It is thought that the amount of induced radioactivity or contamination with radioactivity in the vicinity of an explosion of an atomic bomb will be negligible, and that teams of medical workers and others will be immediately able to enter the area. The problem therefore is reduced to the treatment of external rediation injury, thermal burns, blast injuries and penetrating injuries—in combination or alone. The recommendations are as follows:

1. Facilities should be constructed on the outskirts of all large cities to provide hospital care, facilities for examination of ambulatory casualties and emergency rations for large numbers of persons.

2. One should plan for well trained and strategically placed workers to police and evacuate casualties. . . .

3. One should provide for persons to be on the scene who are capable of calculating the center of the bombed area and determining the radius from the center in which, from the medical point of view, evacuation is essentially useless, the perimeter of the area in which evacuation is worth while and the perimeter beyond which little immediate medical attention is necessary.

Obviously the degree of destruction will depend on how close to the centre of population the bomb explodes, the altitude at which the bomb is detonated and the size of the bomb.

Another possibility remains which must be mentioned—it is the use of radioactive materials in atomic warfare. Jacobson, Stone and Allen state that a discussion of this would require a review of knowledge regarding the biological effects of all the radio elements formed in the fission reaction. They add that the fear that large quantities of radioactive isotopes might be dropped on large cities, in water reservoirs and the like, is as frightening as the thought of bacteriological warfare. At the present time there is no effective method for the removal of isotopes from the body once they have become localized in bone.

Some of the chief features only of the articles mentioned have been touched upon; the subject is enormous and those who can do so will find that a study of these articles will repay them. The answer to the problem is

not essentially medical; it is one for governmental departments and town planners. Chiefly is attention to the ugly possibilities of atomic warfare useful at the present time if it turns the thoughts of the people to the need for the preservation of peace.

# Current Comment.

## THE EFFECT OF SPLENECTOMY ON NEUTROPENIA.

SOME years ago, when agranulocytosis was recognized as a highly dangerous episode, due to toxic and other obscure agents acting on the bone marrow, cyclical types were described. There seems little doubt that a clearer understanding of the vulnerability of the bone marrow to certain drugs with a potentially malign influence on blood formation has lessened the incidence of this condition. Before the war work in Denmark and elsewhere produced striking evidence of this. Now that synthetic drugs of great potency have awakened the need for caution, we have perhaps lost sight of the fact that milder varieties of neutropenia occur without any cause being evident. Dameshek has pointed out that we do not know the causes of a number of hæmatological disturbances, and that it is even possible that some of these may yet be found to be due to nutritive deficiencies or to slow poisoning by some of the chemical substances used in many industries ministering to civilized man. However, when an instance of chronic blood insufficiency is encountered it sometimes puzzles the clinician to suggest a remedy.

H. W. Fullerton and H. L. D. Duguid report from Scotland a case of cyclical agranulocytosis in which gratifying benefit was obtained from removal of the spleen.[1] They remark that only seven cases of this state have been so far reported, and that their own patient seems to be unique, as his illness began in advanced adult life. This man of sixty-two years had no less than twelve attacks of illness in less than a year, in which pyrexia and malaise were associated with the disappearance from the peripheral blood of the granular polymorphonuclear leucocytes. The attacks recurred with remarkable regularity about once a month, and on each occasion there were signs of a clinical infection of various parts of the body, usually the body orifices. For four or five days in every month for a year the neutrophile white cells completely disappeared from the blood. Studies of the bone marrow showed that a periodic failure of the bone marrow occurred; there was no evidence of increased destruction of polymorphonuclear cells, or of a maturation defect. Investigations were carried out in an attempt to reveal the cause, but no useful information was gained. Even transfusion of the patient's plasma to another subject showed no evidence of any leucocytic depressant principle in the blood, nor did estimation of the excretion of some of the sex hormones reveal an abnormality. Treatment was as varied and as fruitless as in most of the other published cases. Sulphonamides were given for several of the infections, but it was established that these drugs were given after the symptoms had arisen, and hence could not be of any causal importance. The decision to perform splenectomy was not, as the authors admit, based on any sure foundation except the known function of the spleen in regulating the formed elements of the blood. In one other published account splenectomy has been described, but the effect was not significant. Fullerton and Duguid, however, had better fortune, for the course of their patient's illness has been altered substanially thereby. Cyclical fluctuations of granular leucocytes have occurred since operation, but these cells have never disappeared from the blood since, and the patient, though with a reduced white cell count, has remained well, and has had no further episodes of fever and infection.

Another apposite report is published in the same journal by Harry A. Weiss and William T. Collins, who describe the effect of splenectomy on a young man who had a chronic neutropenia. This patient suffered from diabetes, and examination of the blood showed him to have a constantly low white cell count, with considerable reduction of the granular forms. One typical count given showed a total of 2650 cells per cubic millimetre, 1% band forms, 56% segmented forms and 43% lymphocytes. No cause could be found, and no treatment was effective. After the spleen had been removed, study of the blood and bone marrow showed a substanial rise in the granular leucocytes. The authors felt that operation was justified by the potential hazard of infection to a diabetic, and since splenectomy the patient has remained well. It should be added that no enlargement of the spleen was found before operation, and examination of the removed organ shed no light on the condition. These reports seem to support the hypothesis of "hypersplenism".

[1] *Blood*, March, 1949.

## A DIENCEPHALIC SYNDROME IN HYPERTENSION.

DIENCEPHALIC SYMPTOMS in certain clinical states were often heard of a few years ago, probably owing to the impact of the work of neurosurgeons on medical thought, which had been inclined to neglect some parts of the central nervous system. As a matter of fact it is twenty years since Penfield wrote of diencephalic autonomic epilepsy.[1] It is therefore in order to recall that a patient who was found later to have a tumour in the hypothalamic region had curious attacks in which he flushed, sweated, salivated, shed tears, and had dilated pupils, slowed breathing, with some hiccup and periodic respiration. Pallor and shivering sometimes heralded loss of consciousness. Some of these strange variants of the epileptic states have also been observed in the subjects of arterial hypertension. In passing it may be remarked that it is interesting that just as neurosurgery emphasized the importance of thinking of organic lesions as possibly causing unusual and mutable syndromes, so in more recent times the rise of psychosomatic medicine has reminded the clinician that purely "functional" states may also cause them. An example is in narcolepsy, though it is admittedly difficult to be sure that no previous encephalitic illness has left its subtle touch on the nervous system. In hypertension we have a condition which is certainly capable of bringing about the most destructive changes in the body, yet can cause temporary upsets of function in different organs without at first doing local harm.

Henry A. Schroeder and Melvin L. Goldman have investigated the action of histamine in producing attacks of the diencephalic type in persons suffering from hypertension.[2] They point out that symptoms arising from diencephalic disturbance fall into several categories: emotional instability, as evidenced by tension, anxiety and even weeping unrelated to the patient's inner emotional status; vasomotor lability, evinced by episodic local flushing, pallor or cyanosis; and the occurrence of sweating, polyuria, and sometimes even low-grade fever. This threefold syndrome may show emphasis on one or other component, and these authors agree with Page, who has written on the subject, that it may be accounted for by a neurogenic factor distinct from the usual pathogenic factors in hypertension. One symptom is easy of recognition, the blotchy "rash" on the chest and back, arms, neck and face, and occasionally the abdomen. This was accordingly selected as the basis of a test by which the presence of what might be loosely termed diencephalic lability could be detected. Embarrassment or excitement could produce this and other related symptoms, but these were not suitable for experimental observations; injection of histamine served the same purpose. Histamine in a dose of 0·25 milligramme of the base was injected intradermally, with the patient recumbent and at rest. Over a hundred patients were so tested, half of them suffering from hypertension and the other half acting as controls. The criteria for a successful testing included flushing of the face and circumoral pallor, present in most instances, headache, lachrymation, blotchy erythema as just

[1] *Archives of Neurology and Psychiatry*, August, 1929.
[2] *The American Journal of Medicine*, February, 1949.

described, and local reaction. Estimations of the blood pressure were also made. It was found that few persons with normal blood pressures responded to this test, but that those suffering from hypertensive states, from whatever cause, were affected in varying degree by the listed symptoms. In addition, some of them complained of other symptoms, such as dizziness, tachycardia and headache, common in hypertension. The authors suggest that histamine may be the cause of these familiar manifestations in hypertensives, though this is only speculation. This investigation is, of course, an approach from the experimental angle to observations long ago made in hypertension, which is known to produce quite early in its course symptoms strikingly similar to those familiar in anxiety states. It is useful to draw attention once more to manifestations of a neurogenic order in this disease. Perhaps it might be an interesting research to attempt some correlation of the diencephalic type of symptoms with the course of the disease and its ultimate result.

## PSYCHIATRIC PATIENTS IN A GENERAL WARD.

THE question of whether or not psychiatric patients should be treated in a general ward is not easily answered. Interest in it is certainly not confined to the psychiatrist. The general practitioner who refers the patient, the physician whose patients share the ward, the hospital administrator, the nursing staff and, not least, the patient, all have a point of view which may need to be considered. Probably the most important factor in favour of the practice is the avoidance of the unfortunate stigma which our ill-informed society insists in forcing on those admitted to any type of mental hospital. The greatest objection comes from the administrative complications associated with the difficult patient. Of interest, therefore, is a report by James Carson and E. Howard Kitching[1] of their experience at the Withington Hospital, Manchester, with an allotment of about 12 beds for psychiatric patients, divided between two wards of 32 beds for males and females respectively. The beds have no special situation in the ward and the remaining beds are occupied by ordinary medical patients. Rather an interesting detail, deliberately arranged, is that instead of the allotment of a house physician to assist the psychiatrist (Kitching) the work was undertaken by the hospital's deputy medical superintendent (Carson). The psychiatrist visits for two sessions a week of two to two and a half hours each, one session being devoted to a strictly limited number of out-patient consultations, all arranged by appointment and only after a physician has made a complete examination. All patients admitted have first to be examined by either Kitching or Carson and approved as suitable for admission. Any patient "unfit to be managed at home in an emergency" is excluded. Those with an affective disorder, particularly of depressive type, or psychoneurosis are considered most suitable for admission. The only psychotherapy possible has been that of kindly interest, reassurance and the discussion of obvious difficulties. Electrical convulsant therapy has been the sheet anchor of treatment, but the use of sedatives, including prolonged narcosis and modified insulin therapy, was found practicable. The nursing staff presented an initial difficulty, because of their inexperience and apprehensive, even hostile, attitude; the difficulty, however, was completely overcome as the scheme developed. Occupational therapy was given as soon as patients could cooperate. We need not consider here the details given by Carson and Kitching of their patients; it is sufficient to state that the results of treatment were quite satisfactory. Occasionally an unsuitable patient was admitted who provided an urgent problem of management, and in some cases chronic grumblers caused trouble and had to be dealt with. A point of real importance was that, though the general patients in the ward knew that their neighbours were under the care of the psychiatrist, the relationship of non-mental to mental patients was friendly and natural. The mental patients, being able to get about more, tended to group together, but this was not due to any antipathy between the two types of patients. Patients starting treatment were encouraged by seeing those recovering and were strengthened in morale by seeing people with severe physical illnesses who were worse off than themselves. Many patients (and their relatives) expressed gratitude for their treatment as normal people in a general ward and the avoidance of a stigma. All of these factors helped in encouraging patients to seek treatment earlier, with the resultant more favourable response and final results, and facilitated social and economic rehabilitation. From every point of view the results must surely be regarded as desirable and the plan warrants encouragement. Actually, of course, it is by no means new to Australian hospitals, though not much has been said about it. It would be interesting to know the present feeling about the practice, both in those hospitals where it is carried on, especially if electrical convulsant therapy has been used, and also in those where it has in the past not been accepted.

[1] *The Lancet*, May 14, 1949.

## HERPES VIRUS AND ATYPICAL PNEUMONIA.

THE clinical, as distinct from the ætiological, diagnosis of pneumonia does not now convey much information to us about its possible course and prognosis, except that the response to specific therapy of one kind or another has considerable diagnostic value. An instance of unexpected information which may come to light when a diagnostic research is undertaken is given in an account by Herbert R. Morgan and Maxwell Finland of an inquiry into the ætiology of *erythema multiforme exudativum* associated with pulmonary lesions.[1] Previous observations had suggested that the cause might be a psittacosis-like virus, and this agent was accordingly sought, and in addition the herpes virus, which has been suspected by other workers. Material was examined from five patients, and immunological investigations were also made. Throat washings, sputum and lung tissue obtained in two fatal cases were used for intracerebral and intraperitoneal injections in mice, and inoculations of chick embryos. Immunological tests included those for cold agglutinins, and influenza antibodies, complement-fixing antibodies for psittacosis and "Q" fever, and neutralizing antibodies against the herpes virus. No virus was isolated from any patient directly, but the lung tissue examined produced a virus which killed mice and was associated with characteristic inclusion bodies in the brain cells. Comprehensive neutralization tests confirmed the belief that this was a strain of herpes virus. Slight rises in the titre of influenza antibodies were demonstrated in two of the patients, but these were thought to be non-specific. No other evidence of an ætiological agent was discovered. The question is, what was the relationship of the herpes type virus found in the lung tissues to the *erythema multiforme exudativum* and the pneumonic changes? The authors remark that this virus has been isolated in the sputum of patients with atypical pneumonia, and therefore some hesitation is felt in assigning a causal role to it without confirmatory evidence by other investigators. The amount of virus present in the lung tissue was large; even after prolonged storage diluted material was lethal to mice, and this seems to preclude the possibility of contamination. The authors feel that they cannot be certain that the psittacosis-lymphogranuloma group of viruses might not have been concerned in some of this small series, as isolation experiments are not always successful. The presence of neutralizing antibodies to herpes in some of the patients is not conclusive either, as many adults show this phenomenon. Nevertheless, future work will be watched with interest. The herpes type virus has provided some interesting investigations in Australia as well as other parts of the world, and as we believe that we are only beginning to realize the extent of the field opened up by virus research, much lies ahead. Recently, for example, work has been done on the association of *herpes labialis* with certain infectious diseases. H. L. Hodes and H. Zepp reported to the Society for Pediatric Research that

[1] *The American Journal of the Medical Sciences*, January, 1949.

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the rarity of herpes in typhoid, as contrasted with its frequency in pneumococcal and meningococcal infections, suggested the possibility that the *Salmonella typhosa* might produce a substance which could inhibit the herpes virus.[1] Experiments have so far failed to establish this, but further work is proceeding. The relationship of the herpes virus has been recognized also in the production of some ocular lesions, such as keratitis, of the kind which cause dendritic ulcers of the cornea. Though the virus of simple herpes is one to which man has a considerable degree of resistance, and with which he has established a certain degree of symbiotic relationship, it does not follow that occasional serious pathogenic lesions may not be caused by it. It will be recalled, too, that during the early investigations into the ætiology of *encephalitis lethargica* some confusion was caused by the death of experimental rabbits, not as it was at first surmised, from the epidemic encephalitis of man, but from a herpetic virus. Pneumonia, too, it seems, though always unpredictable in outcome in individual cases, is not as simple as it looks.

## THE PATHOLOGY OF HYDROCEPHALUS.

HYDROCEPHALUS has been known since ancient times as a clinical condition, but right up to the present time confusion has persisted regarding its pathology. The confusion has been due mainly to incomplete or disputed ideas regarding what has been called the third circulation, that is, the circulation of the cerebro-spinal fluid. There is also not a little significance in the remark of Spiller in 1902:

> It is not necessary to study the different works on hydrocephalus very exhaustively to find that actually observed lesions are much rarer than theories explanatory of the causes of hydrocephalus.

Dorothy S. Russell, who quotes these words, has set out "to meet Spiller's reproach" in a monograph on the pathology of hydrocephalus, which has been issued by the Medical Research Council in their Special Report Series.[2] The author, who is Professor of Pathology in the University of London and director of the Bernhard Baron Institute of Pathology at the London Hospital, has based her study on observations made during seventeen years at the Bernhard Baron Institute and, during the war years, at the Nuffield Department of Surgery at Oxford. Each different type of pathological condition is illustrated by picked cases from the author's series, with the general aim of providing as complete a survey of the morbid anatomy as possible; where necessary a few gaps have been filled in from the literature. Clinical manifestations have received only brief mention, treatment is not considered and theories take a back seat. The result is an original study full of factual material, which should be welcomed by all who are interested in the subject. A brief historical survey, in which is included a translation from the writings of Vesalius of what is thought to be the first clear account of internal hydrocephalus, passes naturally into a discussion of the development of the main current views on the circulation of the cerebro-spinal fluid and the pathogenesis of internal hydrocephalus. The evidence is summarized which indicates that the greater part at least of the cerebro-spinal fluid is formed by the chorioid plexuses and absorbed through the arachnoid villi into the venous blood-stream. From this it follows that there are three main ways in which an excess of cerebro-spinal fluid within the ventricles may occur: through over-secretion from the plexuses, through obstruction at some point in the cerebro-spinal pathway, or from impairment of absorption. From the first hand evidence of the series of cases in the report Russell shows that obstruction is responsible for at least 99% of all cases of internal hydrocephalus, a fact which greatly simplifies the understanding of the pathology of the disease as well as the location of the responsible lesion in a particular case. The very scanty data are considered which have been brought forward to support the significance of over-secretion of the chorioid plexuses; the basic pathological conditions suggested are diffuse hypertrophy of the chorioid plexuses of the lateral ventricles and thrombosis of the great vein of Galen, which, it is thought, may produce excessive secretion of fluid through venous congestion in the plexus, but the evidence does not appear to be conclusive in either case. The third possible mechanism, the interference with absorption as the result of alteration of the arachnoid villi by disease, is discussed at some length, particularly in relation to the so-called "otitic hydrocephalus", a clinical syndrome in which raised intracranial pressure and papilloedema may be associated with sinus thrombosis, but unaccompanied by infection of the leptomeninges or by cerebral abscess. "Admittedly fragmentary evidence" is present to support the suggestion that sinus thrombosis may be followed by a limited degree of internal hydrocephalus after the lapse of a certain length of time, perhaps a few weeks, and that the size of the ventricles may revert to normal, or almost normal, with canalization of the thrombus.

Most of the rest of the monograph is concerned with pathological conditions which produce hydrocephalus through the formation of an obstruction at some point in the pathway of the cerebro-spinal fluid between its formation and its absorption. The classification of hydrocephalus into communicating and non-communicating groups is rejected as being only useful clinically for diagnostic and therapeutic purposes, but not serviceable in pathology. The headings of "congenital" and "acquired", "idiopathic" and "secondary" are considered, in the light of morbid anatomy, to be meaningless. The cases are therefore grouped in the traditional categories of pathological lesions, under the headings of malformations, inflammations, tumours, and so forth; Russell is firmly convinced that in every case some form of obstruction can be demonstrated in the cerebro-spinal pathway and finds no need for the use of the term "idiopathic", which has been applied in the past "to examples which would now be regarded as post-meningitic". Any attempt to summarize, or to provide detailed reference to, the material presented, with its accompanying discussion, could not do it justice; those interested will be well repaid by reference to the original monograph. Chapters are devoted to maldevelopments, gliosis of the aqueduct, inflammations, dural sinus thrombosis and thrombophlebitis, and neoplasms, as well as a discussion on the anatomical effects of the condition. Attention is drawn to the condition in the aqueduct of Sylvius, "often, but erroneously, called 'atresia', but preferably, on histological grounds, termed 'forking'"; gliosis has been clearly distinguished from it and treated separately, being regarded as a proliferation of the subependymal glia and disruption of the ependyma, probably of the nature of a low-grade inflammatory process. Particular interest is shown in the Arnold-Chiari malformation and its relation to *spina bifida*; evidence is put forward to refute the widely held theory that it results from traction from the direction of the spinal cord. Of particular practical interest is the consideration of the after-effects of meningitis and the results of chemotherapy. Russell points out that the modern chemotherapeutic treatment of infective meningitis saves many lives that would have been lost in former days, but that unless treatment is optimal residual lesions must be anticipated, with probably a substantial increase in the corresponding type of hydrocephalus. Limited follow-up studies by other workers have been reassuring to some degree, but the importance of adequate treatment instituted early requires emphasis. The recognition and treatment of infantile meningitis may, it is suggested, bring notable results in the reduction in frequency of the gross hydrocephalus of early childhood hitherto often described as idiopathic. Another practical point is the relative rarity in Russell's series of syphilis as a cause of severe hydrocephalus, despite the importance assigned to it in the past. However, these practical clinical aspects, important as they are, are secondary to the purpose of presenting a comprehensive study of the pathology of hydrocephalus, a purpose admirably attained.

[1] *American Journal of Diseases of Children*, January, 1949.

[2] "Observations on the Pathology of Hydrocephalus", by Dorothy S. Russell; Privy Council, Medical Research Council, Special Report Series, Number 265; 1949. London: His Majesty's Stationery Office. 9½" × 5½", pp. 144, with 90 illustrations. Price: 6s.

# Abstracts from Medical Literature.

## RADIOLOGY.

### Calcified Omental Fat Deposits.

J. F. HOLT AND R. S. MACINTYRE (*American Journal of Roentgenology*, November, 1948) call attention to the occasional occurrence of calcification within tags or lobules of omental fat. They state that such abnormalities are of little or no clinical importance in themselves, but as they produce radiologically visible foci of increased density, they may be erroneously interpreted as biliary or urinary tract calculi or other significant forms of intraabdominal calcification. Like partially calcified fat deposits in other portions of the body, these omental concretions have smooth, dense margins and relatively radiolucent centres. They are apt to be multiple and may exhibit remarkable changes in position over relatively short periods of time.

### Rickets Associated with Other Skeletal Diseases.

R. S. BROMER AND R. M. HARVEY (*Radiology*, July, 1948) discuss the X-ray diagnosis of rhachitic involvement of the skeleton in association with infantile scurvy, with congenital syphilis, with lead poisoning, and with erythroblastic anæmia. They state that when rickets is combined with infantile scurvy, the diagnosis of the associated diseases can be made with a high percentage of accuracy in certain cases by X-ray examination. In most of the combined cases the signs of scurvy tend to obscure those of rickets unless the latter is well developed and severe. Some signs are common to both, as rarefaction and thinning of the cortex, spreading or cupping of the diaphyseal ends, lateral spurs, formation of the rosary at the rib ends, and the appearance of the zone of preparatory calcification. Of the signs of identification of the combined diseases, rarefaction of the cortex is of significance. So-called ground-glass atrophy is not pathognomonic of scurvy, nor is the rarefaction noted in well-developed rickets—often termed moth-eaten or grainy—pathognomonic of that disease. A second observation which is useful is the appearance of the zone of preparatory calcification. In scurvy, it is denser and at times broader than normal. In rickets, in the stage of onset and further development before healing begins, it is frayed out, hazy, and poorly defined. Again, owing to the fact that the rickets is severe, the latter picture has predominated in some cases of the combined diseases. In the X-ray film, rickets may present all the characteristic signs of scurvy, namely, the rarefaction zone in the metaphysis, the cleft at the end of the diaphysis, the dense zone of preparatory calcification and the shadows cast by the periosteum elevated as the result of hæmorrhage. In cases of the combined diseases, the osteoid zone of rickets can be definitely diagnosed by a pronounced increase in the width of the clear space between the epiphyseal centre and the end of the diaphysis. The sign is variable, however, and should not be considered definite unless the space is widened so as to remove all doubt that an actual increase exists. In these cases the zone of preparatory calcification is usually frayed out. In all the combined cases, the ring shadow about the epiphyseal centre has remained intact, indicative of scurvy, although at the end of the diaphysis the zone of preparatory calcification has a frayed-out appearance. Chronic lead poisoning may be associated with active rickets. Since the essential pathological feature of active rickets is the failure of calcification of the preparatory cartilage, it follows that, when active rickets and plumbism are present in combination, the lead lines cannot develop in the bones, because calcification of the preparatory cartilage has ceased. There are two antagonistic mechanisms in simultaneous operation in the preparatory cartilage. One is the result of the lead poisoning, which causes an excessive calcification and "leadification" of the preparatory cartilage, while the second, or the rhachitic component, prevents the deposition of calcium and lead at the same site. When the rhachitic process is severe, one can infer that the preparatory cartilage will not absorb calcium or lead, and the characteristic lead line will be absent. Both calcification and "leadification" of the preparatory cartilage fail in cases of active rickets. This results in a layer of radiolucent uncalcified cartilage and osteoid material in the terminal segment of the bone, in place of the excess of radioopaque calcified and leadified cartilage which develops in plumbism without associated rickets and which is responsible for the lead line in radiographs.

### Tuberculous Calcification.

R. G. BLOCH (*American Journal of Roentgenology*, June, 1948) states that the average minimal period during which adult reinfection tuberculosis can change from the active exudative-caseous state to complete healing by calcification is six to eight years, two to three times as long as in the primary infection focus of the child. Small caseous lesions, especially the metastatic foci which originate from pre-existing excavations through bronchigenic aspiration of bacilli, calcify more easily. This is especially the case after distribution by blood during pulmonary hæmorrhage. Such lesions may be too small to register radiologically in the non-calcified state and become visible only with progressive calcification. The end result frequently is the picture of a well-calcified, widely scattered tuberculosis, in which, however, the original cavernous lesion remains, requiring closure by lung collapse. The development of extensive fibrosis often leads to the radiological diagnosis of complete healing. In such cases it is not possible to discern the already mentioned caseous foci, which may persist as nuclei of the fibrous areas. They will come into view in later years when calcium has been deposited in sufficiently quantity, signifying that the previous state had been one of latency rather than of healing. Even after the appearance of a considerable degree of calcification one should cautiously term such involvements calcio-caseous-fibroid tuberculosis. This avoids the diagnosis of irreversibly healed disease until it has been substantiated by several more years of radiological observation. Incrustation and resorption of caseous material can continue after very extensive calcification has already occurred. Calcification is not an incidental after-effect to an already accomplished healing by fibrosis, but begins early in the development of caseating tuberculous lesions. The occurrence of calcareousness (petrification) does not depend entirely upon the amount of calcium present in the lesion. Lesions or part of such lesions containing large amounts of calcium per space may be still soft and caseous and therefore are capable of unfavourable development. On the other hand, foci of relatively low calcium content may be calcareous and therefore innocuous.

### Tuberculosis of the Stomach and Duodenum.

H. W. OSTRUM AND W. SERBER (*American Journal of Roentgenology*, September, 1948) describe two cases of tuberculosis of the stomach and one of the duodenum. In all three cases the lungs showed no signs of active pulmonary tuberculosis. One patient had had peripheral tuberculous adenitis for years, and in all three cases abdominal lymph-gland involvement was a very prominent feature. All three patients developed perforations or fistulous tracts at the site of their lesions. The authors state that from the radiological standpoint there are no pathognomonic findings in these conditions. The ulcerative and infiltrative lesions can easily be confused with benign ulcer or carcinoma. A combination of both types of lesions, as well as extensive mucosal nodularity, might be suggestive. The most significant findings that can be demonstrated radiologically are simultaneous involvement of the stomach and duodenum, the presence of fistulæ or sinuses, and signs of external pressure by enlarged lymph glands. These should make the examiner strongly consider the likelihood of tuberculosis, even in the absence of any pulmonary lesion.

### Congenital Obstruction of the Stomach and Small Intestine in the Newborn.

E. V. BABYER (*Radiology*, February, 1949) states that hypertrophic pyloric stenosis, the most common congenital obstructive lesion of the gastro-intestinal tract, is probably the only obstructive condition between the œsophagus and rectum in which the clinical history and findings are usually characteristic enough to warrant surgical intervention without X-ray study. Conditions to be considered in the differential diagnosis, such as pyloric spasm, food incompatibility, neurogenic and toxic vomiting, and duodenal obstruction, can usually be excluded on the basis of history and physical examination. It is in the atypical cases, in which absence of a palpable tumour or development of obstructive signs shortly after birth make recognition difficult, that X-ray examination is called for. The radiological signs of hypertrophic pyloric stenosis may be grouped as of supportive and of absolute value. Most of the "classical" signs, such as enlargement and deformity of the stomach, hyperperistalsis, and delayed emptying, are today considered obsolete, and only two signs of supportive value have survived: palpation of a pyloric tumour under the fluoroscope and a delay of more than five minutes in the opening of the pylorus. A routine flat film is valuable in ruling out juxtapyloric

obstruction, in which abnormally large air deposits may be found distal to the stomach. The only absolute radiological sign is the typical deformity of the prepyloric region and pylorus produced by the pyloric hypertrophy. The pyloric canal is narrowed and elongated up to three centimetres at the expense of the distal portion of the antrum, being transformed into a uniform, rigid channel that often shows a crescentic upward swing and usually lies concentrically in relation to antrum and duodenal cap. Both antral and duodenal extremities of the pyloric mass may produce shallow, shoulder-like impressions on the greater and lesser curvature sides of these segments. In order to see these changes and to demonstrate them on "spot" films or conventional radiographs, painstaking fluoroscopy is required. This not only reveals the presence of the characteristic deformity, but also permits optimal timing and positioning (right oblique prone or right lateral) for subsequent filming. Exposures, preferably "spot" films with the baby held in position by a compression device, should be made only when pylorus and proximal part of the duodenum are filled, frequently an event of a fleeting nature whose recurrence should be watched for fluoroscopically, in order to establish persistency of the pathological finding. If, on the initial examination, the pylorus cannot be satisfactorily visualized, it is advisable to reexamine the patient one or two hours later, after atropinization. The spasm frequently associated with organic pyloric stenosis will then be lessened and a more continuous passage established. If only once during the examination the filled prepyloric area and pylorus assume normal or nearly normal proportions, a diagnosis of hypertrophic pyloric stenosis becomes most unlikely.

## PHYSICAL THERAPY.

### Nitrogen Mustard Therapy.

T. LEUCUTIA (*American Journal of Roentgenology*, January, 1947) analyses the progress made and considers the present state of medical usefulness of nitrogen mustard. He states that clinically Hodgkin's disease, lymphosarcoma, the leuchæmias and a few other malignant neoplasms have been considered most suitable for treatment. The average dose was 0·1 milligramme per kilogram of body weight injected intravenously daily for four to six doses. In a series of 102 cases the best results were obtained in Hodgkin's disease. A regression of tumefactions, splenomegaly, fever and bone pain was noted lasting in many cases over many months. In view of the fact that many of these patients were already radiation-"resistant", this palliative effect was regarded as good. In lymphosarcoma the clinical improvement was not as pronounced, but in a few cases response was satisfactory. In chronic myelogenous leuchæmia the response was often impressive. In the acute leuchæmias and other malignant growths results were indefinite. The authors state that there are two disadvantages of nitrogen mustard, firstly, nausea and vomiting following the first injection, and secondly, the depressant effect upon the cellular elements of the blood. A new type of nitrogen mustard SK136 has been found to cause much less nausea and vomiting. The question of the clinical use of nitrogen mustard therapy with simultaneous radiotherapy is discussed. The author states that not enough clinical work has been done in this field, but it appears that the effects are at least additive. The impression is gained that to obtain the best results a full course of nitrogen mustard must precede the X-ray therapy. The author's summary of the relative merits of irradiation and nitrogen mustard is as follows. Nitrogen mustard is indispensable in cases of generalized Hodgkin's disease, in advanced cases of lymphosarcoma in which there is an immediate threat to life, and in anaplastic carcinoma of the lung. In early cases of Hodgkin's disease, in most cases of lymphosarcoma and in the majority of cases of leuchæmia, it seems doubtful whether nitrogen mustard is as good an agent as X-ray therapy. None of the nitrogen mustards has given any indication of ability to cure any of the types of cancer treated.

### Irradiation of Pituitary Tumours.

H. DABNEY KERR (*American Journal of Roentgenology*, September, 1948) discusses the diagnosis and indications for irradiation of pituitary tumours and gives the results in a series of 25 cases presented in 1941 with those in an additional 30 cases. He considers that all types of pituitary tumours, eosinophilic, chromophobic and basophilic, should receive primary irradiation. The chromophobic tumour is just as sensitive as the eosinophilic. There appear to be only three conditions which would contraindicate irradiation, namely, suspicion of a cystic tumour, evidence of hæmorrhage into the tumour and increased intracranial pressure. It is useless to irradiate a cystic tumour. The author suggests that patients having any constriction of the visual fields should have these tested frequently, and, if there is continued decrease two months after cessation of irradiation, operation should be advised. The author in fact advised operation in all cases in which satisfactory response was not shown after two months. The technique of irradiation is to use four fields, two temporal, one vertical and one frontal, with 2000*r* on each giving a tumour dose of 2400*r* approximately. This has been the method for five years only. Before that a tumour dose of 3000*r* to 3600*r* was given. The results were excellent in 56% of cases, good in 20% and poor in 24%, over a period of at least six years. For the patients treated more recently the figures are approximately the same. There does not appear to be any evidence of subsequent cerebral damage with the technique employed.

### Mixed Tumours of the Palate.

MAX CUTLER (*American Journal of Roentgenology*, January, 1949) reports the results of irradiation of five mixed tumours of the palate treated between 1938 and 1942. Four were treated by teleradium and supplementary interstitial irradiation, one by teleradium alone. The author states that mixed salivary tumours of the palate rarely cause symptoms until they have reached a considerable size. They are slow growing. Metastases are infrequent and occur late. Operable tumours are best treated surgically; irradiation is a valuable adjunct to treatment. The author states that Ahlbom of the Radiumhemmet gives pre-operative irradiation for all but the smallest lesions; radiotherapy is used alone for inoperable lesions and for operable lesions which have proved radiosensitive. The author's five cases are reported to show the results that can be obtained with a tumour usually regarded as radioresistant. Of his five patients, one died eight years after treatment for a recurrence, but dosage was inadequate owing to the patient's age and infirmity. Dosage was high in the four cases treated successfully, and the conclusion drawn is that in advanced cases in which previously palliative treatment only was given, a more radical method of irradiation could produce cures.

### Cancer of the Cervix Uteri.

J. CORSCADEN, S. B. GUSBERG AND C. DONLAN (*American Journal of Roentgenology*, October, 1948) state that constant efforts are required to improve irradiation technique in treatment of carcinoma of the *cervix uteri*. Stimulated by the promising clinical results obtained by the interstitial technique of Pitts and Waterman, they attempted to find an interstitial distribution of radium which would give comparatively uniform dosage. They state that in the common technique of intracavitary radium application supplemented by external X radiation, the dose to the lateral pelvic walls is inadequate, and this is the main problem. After many trials they devised a distribution of radium with intracavitary and interstitial needles, which gives a dose of 11,000*r* to the cervix and 10,000*r* to the lateral pelvic walls. The details of the technique are given and the authors claim that damage to important structures, such as bladder, ureter or rectum, is unlikely if care is exercised. No clinical results are presented in detail, but all the patients treated had stage III growths and the immediate results are described as striking.

### X-Ray Treatment of Bronchial Asthma.

E. LEDDY AND C. MAYTUM (*Radiology*, February, 1949) review treatment of bronchial asthma by X rays, which were used only after specific or non-specific therapy had failed. All patients treated were severely affected. The authors state that the technique has varied over the years with an increasing tendency to lowering of dosage. For example, patients treated in 1933 were given a dose of 550*r* to the mediastinum over two days. This produced better results than the previously tried methods of irradiating the spleen or cervical sympathetic chain. An impression has been gained that the more severe and chronic the disease, the better the result; in cases also in which infection is present in the bronchial tubes, response is usually good. The authors are now inclining to the technique of giving doses of 250*r* to a large anterior mediastinal field and the same dose to a posterior field on the day following. With this method 53% of good results are obtained and 21% of fair results. The results with the low-dosage technique appear superior to the results from higher dosage, and it is suggested that a dose of 100*r* in severe asthma should be tried. Prophylactic irradiation to prevent attacks does not seem to be effective, and further treatment is not given until symptoms recur.

# British Medical Association News.

## SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal Prince Alfred Hospital on May 19, 1949. The meeting took the form of a series of clinical demonstrations by members of the honorary medical and surgical staff of the hospital.

### Hiatus Hernia.

DR. A. W. MORROW and DR. STANLEY GOULSTON demonstrated four patients with œsophageal hiatus hernia. All four patients were women in the age period from 52 to 65 years and all were overweight.

The first patient had presented with a history of hæmatemesis of slight degree commencing eight months previously. She was able to eat only soft foods, as solids seemed to stick at the lower end of the sternum and result in discomfort, which could sometimes be relieved by reclining. She was also dyspnœic on slight effort. X-ray examination after a barium meal revealed a large hernia with the stomach high in the thorax. Her condition had been much improved by attention to diet and the administration of alkalis and hæmatinics.

The second patient was a laundrywoman, who was found to have a curious heart shadow on routine X-ray examination of the chest. Examination after a barium meal revealed a very large hiatus hernia including most of the stomach and part of the colon in the thorax. She was completely symptomless.

The third patient was diagnosed clinically and radiologically as having a carcinoma of the lower end of the œsophagus. Gastroscopy was performed to see if there was any involvement of the cardia, and it was noted that gastric mucosa extended well up into what would normally be œsophagus. On careful radiological reexamination she was found to have a hiatus hernia and had since responded well to medical treatment.

The fourth patient had presented with dyspepsia of vague nature, which was not typically that of peptic ulceration. The pain extended upwards over the precordium and was worse after meals and on effort. X-ray examination after a barium meal showed a small hiatus hernia and no other abnormality, her heart being of normal size; her electrocardiogram was normal. Her condition had improved with a medical régime.

Dr. Morrow and Dr. Goulston also presented a demonstration of X-ray studies and clinical histories showing the different modes of onset of conditions diagnosed as hiatus hernia occurring in patients admitted to the Royal Prince Alfred Hospital during the previous four years. The patients had presented with obstructive symptoms, with anæmia of obscure origin, with dyspepsia, or with symptoms suggestive of coronary disease or cardiospasm. The condition had been frequently accompanied by duodenal diverticula and by diverticulosis of the large bowel and occasionally complicated by peptic ulceration. A diagnosis had often been made of gall-bladder disease, peptic ulceration or coronary sclerosis. An analysis of the patients showed that about 75% could remain comfortable and have their symptoms relieved in part by medical treatment alone.

### Lung Resection in Pulmonary Tuberculosis.

DR. COTTER HARVEY showed patients illustrating lung resection in pulmonary tuberculosis. He stated that among the indications was a high-grade bronchial stenosis, and showed X-ray films of the chests of two patients in whom that condition had led to complete atelectasis of one lung. After consideration of vital capacity and careful appraisal of the state of the opposite lung, a pneumonectomy was performed by Dr. J. S. MacMahon in each case, under the cover of streptomycin (0·5 gramme daily for one month). Immediate convalescence in each case was uneventful, and the patients returned to a sanatorium after six weeks in hospital. Unfortunately, in one case, an extensive tuberculous pleurisy was found at operation, and tuberculous empyema supervened; consideration was being given to a thoracoplasty. In the second case, recovery was apparently complete.

Two patients were then shown with lower-lobe cavities; the advisability of lobectomy was under consideration. In one case, artificial pneumothorax had resulted in apparent cavity closure, but later a tension cavity appeared, indicating active bronchial disease. Streptomycin was given and partial reexpansion of the lung permitted. At the time of the meeting it seemed possible that the cavity would close without surgery. But it was emphasized that treatment with the antibiotic would not be continued for more than one month, lest drug-resistance should emerge, rendering more hazardous any future surgical attack. In the second case, a large cavity was seen to be situated in the apex of the lower lobe, and the upper lobe appeared free from disease. It was decided in that case, also, to attempt artificial pneumothorax, with the feeling, however, that it would probably fail, and lobectomy would have to be carried out.

### Unresolved Pneumonia.

DR. MAURICE JOSEPH discussed the dangers of the diagnosis of "unresolved pneumonia". He stated that if apparent pneumonia failed to resolve in the expected manner one should use all the diagnostic methods at one's disposal to determine the underlying pathology. Such investigations would include repeated X-ray examinations, examinations of sputum or the fluid from gastric lavage for tubercle bacilli, bronchoscopy and bronchography. Dr. Joseph stressed the point that a diagnosis of unresolved pneumonia, especially in a middle-aged to elderly patient, should be merely a tentative one and a challenge to the physician to determine the cause of the persistent pulmonary lesion. He illustrated his remarks with the histories and radiographs of four patients.

The first patient was a man, aged sixty-two years, who three months prior to coming under observation had had what was regarded as right lower lobar pneumonia. It responded slowly to penicillin and sulphonamides, his temperature gradually subsiding. However, the patient continued to lose weight and had a persistent though slight cough, and an X-ray examination showed that the right basal opacity had failed to resolve. Bronchoscopy revealed a carcinoma of the right lower-lobe bronchus, which on biopsy proved to be of an anaplastic type.

The second patient was a man, aged forty-one years, who in October, 1948, had had what was considered to be a right lower-lobe pneumonia which failed to resolve and led to an empyema. That was drained and he made an apparent recovery, but the condition recurred and he was admitted to hospital with an *empyema necessitatis*. On bronchoscopy there was seen to be an irregular narrowing of the right lower-lobe bronchus due to a friable tumour, which biopsy showed to be a squamous carcinoma.

The third patient was a woman, aged twenty-one years, who had what was considered from its mode of onset and signs to be typical left lower lobe pneumonia. However, it failed to respond in the usual way to the antibiotics, and the patient was kept in bed for four months, being regarded as having "unresolved pneumonia". Her sputum at that time contained no tubercle bacilli. She resumed her studies at the university, and despite a number of "colds" remained apparently well for four months; then an increasing cough led to a further X-ray examination, which showed a cavity in the apex of the lower lobe of the left lung, and her sputum was found to contain tubercle bacilli.

The fourth patient was a woman, aged twenty years, who had reported to hospital in August, 1947, because of a cough. Fifteen months previously she had had an X-ray examination of her chest on a five by four inch film which was reported as showing no abnormality. She had been in hospital in February, 1947, with pleurisy and pneumonia. A film at that time was reported to show left basal pneumonia, while one taken six weeks later was declared to be normal. She married and became pregnant, remaining well except for her cough and the fact that for three weeks prior to reporting she had noticed a "knock" in her left side on taking a deep breath. An X-ray film taken at that time was reported as showing "unresolved pneumonia of the left lower lobe with partial atelectasis". However, bronchoscopy and a bronchogram revealed the "unresolved pneumonia" to be left basal bronchiectasis.

### Arthritis Clinic.

A demonstration was given by the members of the arthritis clinic, DR. SELWYN NELSON, DR. L. J. WOODLAND and DR. B. G. WADE. The organization of the clinic was shown in a diagram setting out the means by which sufferers were admitted to the clinic via indoor and outdoor medical or surgical units, passing to the physician in charge of the clinic for diagnosis and investigation, thence to an assessment panel consisting of physician, orthopædic surgeon and specialist in physical medicine for appraisal and detailed consideration of a planned course of therapy. The role of the almoner was illustrated in the various phases of the patient's treatment, and reference was made to the importance of the economic rehabilitation of the patient.

*Rheumatoid Arthritis.*

Four patients were shown suffering from rheumatoid arthritis. The first demonstrated the mild form of the disease when the age of onset was late, the patient being a female, aged seventy-two years. The constitutional effects were extremely mild and clinical and radiographical changes were confined to the hands and wrists. The second demonstrated the severe constitutional effects in a young woman who had developed arthritis at the age of thirty-two years after an attack of scarlet fever. The arthritic changes were of the rheumatoid type. The spleen was palpable. The patient had originally been treated as an in-patient, when severe and persistent pyrexia had been a notable feature of her condition. The third patient in the group was a single woman, aged forty-nine years, who showed the classical features of the disease. The onset of her illness had been at the age of forty-two years; constitutional features were of mild degree. Although there was restriction of movement in the wrists, the most crippling deformity in her case was limitation of full extension of the right knee by 20°, a condition extremely difficult to correct. The fourth patient was a male, aged forty-one years, who had developed bilateral pulmonary tuberculosis during the course of his arthritis. He illustrated the favourable results derived from properly administered physiotherapy (heat and active exercises) in the treatment of limitation of movement of the shoulders. In the course of ten weeks he had regained almost full movement in both shoulders after initial limitation of abduction to 20°. All the patients in this series were receiving gold therapy (aqueous "Myocrisin") in doses not exceeding 50 milligrammes weekly.

*Arthritis Associated with Psoriasis.*

The second group of patients had arthritis of disputed ætiology. A patient suffering from long-standing psoriasis with arthritis illustrated certain points of difference between that type of arthritis and classical rheumatoid arthritis. He was a man, aged seventy-five years, who had had psoriasis for many years, and who had involvement of the nails and changes in the interphalangeal joints, including the distal, which were not usually involved in the classical type of rheumatoid arthritis.

*Ankylosing Spondylitis.*

A young artisan, aged twenty-seven years, was presented as a subject of ankylosing spondylitis, with restriction of chest movement, kyphosis and involvement of the left knee. He had originally complained of pain in the hips extending down the legs, presumably due to early sacro-iliac involvement. At the time of presentation he had been under treatment for five weeks, the methods used being deep X-ray therapy to the vertebral column, a plaster bed to correct the kyphosis, and active breathing exercises to increase chest movement. Considerable improvement had followed the therapy, but permanent results could be assessed only after a longer period of observation.

*Osteoarthritis.*

A woman, aged seventy-three years, was presented as showing a typical example of osteoarthritis. Heberden's nodes were present. The main symptoms were noted in the knees, although there was X-ray evidence of osteoarthritic change in the vertebral column and hands.

*X-Ray Demonstration.*

Films illustrating the differential diagnosis of the translucent areas in gout and rheumatoid arthritis were shown, as well as typical examples of the X-ray appearances of the different forms of arthritis.

### Anorexia Nervosa.

PROFESSOR W. S. DAWSON presented an unmarried woman, aged twenty-one years, who three years previously after a psychological upset had taken aperients in large doses, become disinclined to eat and lost a stone and a half from an initial weight of seven stone six pounds. She was treated in a psychiatric clinic with improvement. Since then she had from time to time complained of nausea, occasional vomiting and abdominal pains, also of thirst and falling out of hair. Her appetite gradually failed and she was admitted to the Royal Prince Alfred Hospital in an emaciated condition. Her menstrual periods had been absent for the past three years. Examination in the general medical wards revealed a blood pressure of 100 millimetres of mercury (systolic) and 50 millimetres (diastolic), a basal metabolic rate of −12%, a flattened curve in the record of the glucose tolerance test, a blood hæmoglobin value of 30%, and a leucocyte count of 18,500 per cubic millimetre, 80% being neutrophile cells and 15% lymphocytes. She did not respond to general measures and was transferred to the psychiatry pavilion, her weight being three stone two pounds. She was being treated with subcoma insulin therapy and injections of anterior pituitary extract. After attempting to refuse food, she had agreed to do her best by the diet offered to her and was generally more cooperative. She was slowly regaining weight.

### Cerebral Sclerosis, Possibly Amyotrophic Lateral Sclerosis.

Professor Dawson's second patient was a woman, aged forty-four years, with six healthy children. Three years previously she had begun to suffer from attacks in which she lost consciousness for from a half to two and a half hours and had spasms of the face and hands. Those attacks occurred about once a month at first, but more recently about once a week. She had always been of a worrying nature. For the past year she had had increasing weakness in the right hand and for the past three months both hands had been weak so that she frequently dropped things. During the past few months she had become more and more cheerful. Three months before the meeting she was in a "coma" for twenty-four hours and appeared to be paralysed down the right side when she "came to". Since then her speech had been indistinct. She had never complained of headaches. On her admission to hospital the condition indicated bilateral upper motor neuron involvement, without sensory impairment, but with flaccidity of the upper limbs and some wasting of the small muscles of the hand. Dr. G. Trahair reported that an electroencephalogram taken just after a seizure suggested an extensive lesion in the left hemisphere. Two weeks later the electroencephalogram still showed focal disturbances of lesser degree indicating some pathological condition in the subcortex of the left hemisphere. Dr. G. Phillips reported that air encephalograms showed the left lateral ventricle to be larger than the right with the roof elevated. No shift of the septum was present. There were indications of some generalized atrophy of the left hemisphere. The cerebro-spinal fluid showed no abnormal reactions. On the patient's regaining consciousness after the air studies, it was noted that both arms were spastic from being flaccid and the wasting of the small muscles of the hand was obscured by œdema. The cranial nerves were intact except for dysarthria. The patient could follow movements of the finger with her eyes, frown, smile and protrude her tongue. There was no wasting of the tongue. The arms were spastic. Wasting of the small muscles of the hand was again apparent with subsidence of the œdema. The abdominal reflexes were not elicited. There was limited capacity to flex and extend the legs. The tendon reflexes were brisker on the right side. The plantar responses were extensor on both sides with a crossed response on stimulation of the left sole. The patient was continuing to have seizures at intervals of about a week, with twitching of the lips and mild clonic movements in both arms, and loss of consciousness for about half an hour.

### Narcolepsy with Cataplexy.

Professor Dawson's third patient was a married woman, aged thirty-seven years, with four children. Three months previously she had had an attack of "gastric 'flu" with vomiting and a raised temperature for four days; she was in bed for three days. She was not delirious and had no other cerebral symptoms. After seeming to convalesce for two weeks she began to fall asleep while resting in a chair during the day. Sleep at night had been restful throughout, with occasional dreaming. The drowsiness and sleep by day had occurred only when she was resting, never when she was on her feet. Sometimes she dreamt during those attacks, which lasted up to an hour, and usually woke with a thick feeling at the back of the head. About six weeks before the meeting, which was about two weeks after the onset of the narcoleptic attacks, she had noticed that her legs gave way when she was laughing, so that she had often fallen onto her knees. She had also noticed a sudden transient weakness of the right arm, and a tendency for her head to jerk forward, but only when she was laughing. Her psychiatric history was uneventful and she described herself as a cheerful, active woman before the present illness. "Benzedrine" kept her awake by day, but had little effect in the cataplectic attacks. No neurological abnormality had been detected on clinical examination. The blood picture was within normal limits. The cerebro-spinal fluid contained no abnormal constituents. An electroencephalogram, according to a report by Dr. G. Trahair, was an abnormal record showing mild paroxysmal features; such records were not uncommon in narcolepsy, but were not characteristic. Professor Dawson pointed out that Gélineau in

1880 had described the association of fits of sleep with transient attacks of powerlessness or tonelessness in the limbs. The term "cataplexy" was given to the latter phenomenon by Henneberg in 1916. S. A. K. Wilson held that the syndrome was related to and often closely associated with epilepsy.

### Skin Rashes of the Erythemato-Squamous Group.

DR. CLIVE ROBINSON presented a boy, aged nineteen years, with an early roseolar syphilitic rash confined to the trunk. The patient denied the occurrence of coitus. A primary lesion was present in the rectum. There were no constitutional symptoms. The patient was to have 4,800,000 to 5,000,000 units of aqueous penicillin G at the rate of 75,000 units every three hours. No arsenic or bismuth would be given.

Dr. Robinson's second patient was a man, aged thirty-two years, with a primary sore on the lip and a maculo-papular specific rash on the limbs, trunk, face, palms and soles. The patient had general malaise, a raised temperature and glandular enlargement. Dr. Robinson commented that the infection was evidenly due to a much more active spirochæte than in the previous case. Treatment would be the same in both cases.

The third patient, a male, aged fifty-four years, had a deep-seated vesiculo-pustular rash on the inner aspect of the soles of the feet. The conditions to be considered in differential diagnosis were dermatomycosis, so-called pustular psoriasis and pustular bacterid which was a skin manifestation of some toxin in the system. Microscopic examination provided no significant information and culture provided no evidence of tinea, but pyogenic bacilli were grown. No other signs of psoriasis were present and a final diagnosis was made of pustular bacterid. For treatment the removal of septic tonsils was recommended.

The fourth patient was a woman, aged forty years, who had *lichen planus* on the forearms and who had developed severe contact dermatitis and a sensitization rash on all the extremities from the application of 2% "Benzocain" in calamine lotion.

The next patient, a female, aged forty-five years, had, when first examined, the typical plaques of psoriasis around the umbilicus. Under the breasts and in the folds of the thighs were red macerated areas, which were originally flexural psoriasis, a common variety at the climacteric. At the time of the meeting she had a superadded infection and a generalized auto-sensitization rash, which in no way resembled psoriasis. The application of local antiseptic, such as gentian violet 1% in aqueous solution, was recommended for the intertriginous areas and glandular therapy for the patient's gross overweight and glandular dysfunction.

The sixth patient was a man, aged forty-seven years, with a widely distributed maculo-papular rash on the trunk. The lesions were very red and looked acute. He had a seborrhœic diathesis. According to the history given the condition cleared up with any mild local treatment, but relapsed with any emotional disturbance in the household. He had had a violent altercation with his wife a few days before the meeting and the present acute condition was a result. He needed psychosomatic treatment and the application of any soothing local remedy.

The last patient in the group was a man, aged fifty-seven years, with an exfoliating keratotic condition of the hands and feet. It had been suspected that he was suffering from an excessive intake of arsenic. However, all tests had failed to reveal the presence of arsenic. As he had an enlarged liver and a muddy brown colour, his condition was being investigated for evidence of hæmochromatosis. He had no glycosuria at the time of the meeting.

### Subdiaphragmatic Total Gastrectomy.

DR. F. W. NIESCHE presented two patients suffering from carcinoma of the stomach, who had undergone subdiaphragmatic total gastrectomy. The first patient, a man, aged sixty-four years, had had intermittent epigastric pain for twelve months, constant pain for three months with a sensation of fullness, anorexia for one month, but no vomiting and very little flatulence. On examination, he had a palpable mass high up in the epigastrium, hypochlorhydria, a hæmoglobin value of 90% and serum protent content of 7·0 grammes *per centum*. X-ray examination revealed a large filling defect arising from the lesser curvature proximal to the angularis, the appearances being those of carcinoma. A gastroscopic examination revealed a cauliflower-like mass on the anterior wall of the middle of the stomach extending to the lesser curvature and posterior wall. It was thought to be almost certainly malignant, and appeared to be an encephaloid carcinoma. At operation a large infiltrating mass was found extending almost the entire length of the lesser curvature from angularis to cardia. The regional lymph glands were involved. A post-colic œsophago-jejunostomy was performed with an entero-enterostomy, a Levine's tube being passed through the anastomosis. The pathologist reported that the stomach was occupied by a large infiltrating carcinomatous ulcer, which measured twelve centimetres in maximum diameter. The tumour was very cellular. The lymphatic gland contained metastatic carcinoma. During convalescence the patient developed a right pulmonary thrombosis and a mild grade of infection in his wound, but otherwise his progress was satisfactory. At the time of the meeting he was well and taking food without any difficulty.

The second patient was a woman, aged sixty-three years, who had been in good health until January, 1949, when she became weak and easily fatigued. Since then she had lost one and a half stone in weight. She had severe anorexia and pain in the epigastrium and right hypochondrium, which bore no relation to meals and was relieved by "powders". She had intermittent vomiting. Examination revealed obvious loss of weight, epigastric tenderness and a doubtful epigastric mass. X-ray examination revealed a carcinoma of the upper third of the body of the stomach. The hæmoglobin value was 72%, the serum protein content 6·5 grammes *per centum* and the blood urea content 34 milligrammes *per centum*. Before operation the patient was given a diet of high liquid protein content. At operation a tumour was found involving nearly all the lesser curvature and posterior wall of the stomach and infiltrating the body of the pancreas. Total gastrectomy was performed, but the pancreas had to be transected at the neck, the whole of the body of the pancreas and the spleen being removed with the growth. The patient's convalescence had been satisfactory. She had had temporary jaundice considered to be due to œdema in the head of the pancreas. She felt well, her appetite was satisfactory and she was gradually gaining in strength.

### Cardiospasm.

Dr. Niesche then presented four patients with cardiospasm, who had been treated by Heller's operation. In each case a transthoracic approach was made through the eighth intercostal space. The diaphragm was incised to expose the cardio-œsophageal junction. A longitudinal incision was made through the muscle coats of the œsophagus and stomach to expose the mucosa and to allow free herniation. The incision was about three inches in length and centred on the cardio-œsophageal junction. The diphragm was repaired with interrupted sutures, and the thorax closed.

The first patient, a man, aged fifty-six years, had had difficulty in swallowing for about three years, at first with liquids, and more recently with solids. Regurgitation of food occurred intermittently. There was no pain, but only nausea relieved by vomiting. The patient had been in hospital one year previously with the same complaint, and had undergone many dilatations. X-ray examination revealed cardiospasm with much dilatation of the œsophagus. Convalescence was satisfactory after operation, except for evacuation of a hæmatoma in the incision. X-ray examination ten months after operation showed slight narrowing of the lower end of the œsophagus, with slight delay in the passage of a bolus, but no delay in the passage of a fluid meal. At the time of the meeting the patient was well; he had some flatulence, but no difficulty with his meals.

The second patient, a man, aged forty-six years, had also had difficulty in swallowing for three years, solid food being more easily swallowed than liquids. Difficulty was less at certain times of the day. He suffered from much regurgitation and vomiting of food. Dilatation had been carried out on three occasions. Œsophagoscopic examination revealed a large pouch at the lower end of the œsophagus with cardiospasm, and the X-ray appearance corresponded. After operation convalescence was uneventful. He was discharged from hospital seventeen days after operation, and had had no difficulty since in swallowing fluids or solids.

The third patient, a man, aged forty-one years, had had difficulty in swallowing for eight years, with a considerable increase in symptoms during the past nine months and loss of one and a half stone in weight. He had much flatulence and vomited occasionally. X-ray examination in 1947 had revealed cardiospasm, and since then he had been passing bougies before meals. In September, 1948, he was admitted to hospital, and a mercury bougie was passed daily. That helped him to eat breakfast; but other meals stuck at the lower end of his œsophagus. Operation was performed in January, 1949, after radiological confirmation of the diagnosis. Convalescence was satisfactory, apart from the development of an effusion at the base of the left

lung. At the time of the meeting his condition was very satisfactory and he had no difficulty in swallowing. A recent X-ray examination had shown that the œsophagus had a normal outline. The patient had gained over one stone in weight.

The fourth patient in the group, a man, aged fifty-seven years, had had gradually increasing difficulty in swallowing for eighteen months, regurgitation of food and loss of one stone in weight. X-ray examination revealed an obstruction in the cardio-œsophageal region, which, it was considered, might be due to cardiospasm or to new-growth. Biopsy carried out during œsophagoscopic examination provided no evidence of malignant disease. Operation was performed early in March, 1949, and convalescence was uneventful. At the time of the meeting the patient was well and had no difficulty in swallowing.

### Laryngectomy.

Dr. Niesche then presented two patients who had undergone laryngectomy for carcinoma of the larynx. In both cases a bilateral block dissection of the lymphatic field was carried out, and the tissue was removed with the larynx in one piece. The first patient, a man, aged fifty-two years, had been treated for laryngeal carcinoma at the Radium Clinic of the Royal Prince Alfred Hospital early in 1947, a radon ring and seeds being inserted. He was readmitted to hospital in January, 1949, having complained of increasing hoarseness for twelve weeks and of pain behind the left ear and down the left side of the neck. Laryngoscopic examination revealed a recurrence of the growth, ulcerating the anterior half of the left vocal cord, and abnormal tissue in the commissural tissue. The right vocal cord had compensative hypertrophy. The cricoid glands were palpable. Operation was performed on January 26, 1949, and, apart from a small temporary laryngeal fistula, convalescence was uneventful. At the time of the meeting the patient was well and had learnt to speak clearly. The pathologist reported the presence of a small ulcer about 1·1 centimetres in diameter, which had destroyed the anterior half of the left vocal cord. On microscopic examination the floor of the ulcer was found to be covered by a necrotic crust with, deep to that, hyaline fibrous tissue. To one side of the ulcer the tissue was infiltrated by carcinoma cells, and the growth extended deeply into the very dense fibrous tissue.

The other patient, a man, aged sixty-eight years, had had increasing hoarseness for one year or more. Examination revealed inflamed pharynx, tonsils with purulent crypts and loose carious teeth. Laryngoscopic examination revealed a neoplasm involving the whole of the right vocal cord and a contact ulcer of the left cord. The cords approximated on phonation. No glands were palpable in the neck. Biopsy report disclosed that the growth was a squamous epithelioma. On March 17, 1949, the carious teeth were extracted, and on March 30 laryngectomy was performed. A small pharyngeal fistula developed after operation, but soon closed. Convalescence was otherwise satisfactory. The pathologist reported the presence of a large carcinomatous ulcer which had replaced the right vocal cord and pushed the right false cord upwards. It covered an area measuring 2·3 by 1·9 centimetres. Microscopically the lesion was found to be a squamous epithelioma with fairly deep invasion of surrounding tissues.

*(To be continued.)*

## Correspondence.

### AN UNUSUAL CASE OF AMBLYOPIA OCCURRING AT PARTURITION.

SIR: The case reported by Dr. K. Melville Kelly, of Hobart, in THE MEDICAL JOURNAL OF AUSTRALIA, June 4, 1949, page 745, of Mrs. B. developing amblyopia at parturition following pre-natal hypertension and albuminuria is of particular interest to me at present as I am examining the fundi of many normal and preeclamptic pregnant women. I think the crux of the ocular examination reported is the note of small arteries. Invariably when the blood pressure is raised and albuminuria is present spasm of the retinal arteries can be found; this is of varying degree and most readily seen in the nasal branches of the retinal arteries, often associated with some retinal œdema and occasionally in the more severe cases with small capillary hæmorrhages, in these latter cases presenting the picture, or nearly so, of eclamptic retinopathy.

Since retinal artery spasm in this condition is common, I see no reason why both retinal arteries may not spasm sufficiently in rare cases to be temporally occluded and result in amblyopia. If the occlusion were short-lived, the amblyopia would not be prolonged, hæmorrhages may not occur, but retinal œdema would, and visual acuity would slowly improve, as in the case reported, as the œdema subsided.

Yours, etc.,

Anson Street,
Orange,
New South Wales.
June 6, 1949.

K. B. REDMOND.

### BABY BORN WITH PERINEAL TEAR.

SIR: A perineal tear in a baby is not a hazard which one would expect to encounter at a confinement, but it actually occurred recently in my practice.

A *primipara*, aged twenty-eight, came into labour two weeks before the expected date. The presentation was a breech with extended legs. Before the legs were brought down there was considerable stretching of the child's buttocks, the vaginal walls and vulval margin and the child's skin being unusually dry and free from vernix, while the uterine contractions were very strong. After a shallow episiotomy the legs were brought down and the child was delivered without mishap. On examination after birth she was found to have a very neat second degree perineal laceration. It should be added that there had been no vaginal examination since early pregnancy.

The occurrence must be unusual, and it was thought to be of sufficient interest to record.

Yours, etc.,

181 Liverpool Road,
Ashfield,
New South Wales.
June 8, 1949.

E. NEIL MCQUEEN.

## Post-Graduate Work.

### THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR JULY.

#### Classes for Higher Degrees and Diplomas.

CLASSES for Part I M.D., M.S., D.O., D.L.O., D.G.O., D.D.R. and D.A. will be continued at the university.

*M.D. Part II and M.R.A.C.P.*

*Neurology.*—On July 7 a demonstration in neurology will be given by Dr. E. G. Robertson at 2 p.m. at the Royal Melbourne Hospital; on July 5 and 12, demonstrations will be given by Dr. L. B. Cox at 10 a.m. at the Alfred Hospital.

*Renal Disorders.*—The following classes have been arranged by Dr. L. Hurley to be held at the Royal Melbourne Hospital at 2 p.m.: July 12, "Classification of Nephritis. Albuminuria", July 14, "Acute Nephritis", July 19, "Subacute Nephritis (Nephrosis Type II Nephritis)", Dr. L. Hurley; July 21, "Essential Hypertension", July 26, "Chronic Nephritis", July 28, "Uræmia", Dr. J. L. Frew.

#### Course for General Practitioners.

*Obstetrics and Gynæcology.*

Lectures in obstetrics and gynæcology will be given on Wednesdays at 8.30 p.m. at the Women's Hospital under the auspices of the Victorian State Committee of the Royal College of Obstetricians and Gynæcologists. These lectures will now commence in July and continue until September 21; the first three lectures of the programme as originally announced will now be given at the end of the course. The July lectures will be as follows: July 13: "Breech Presentation: Its Management", Dr. W. M. Lemmon; July 27: "The Significance of the Retroverted Uterus", Dr. L. W. Gleadell. The fees are 10s. 6d. each lecture or £2 2s. for the course of six lectures.

*Clinic at the Eye and Ear Hospital.*

On Wednesday, July 6, at 4.30 p.m., Dr. Cecil Cantor's ear, nose and throat clinic will be conducted. There is no charge for attendance at this clinic.

COURSES SUITABLE FOR CANDIDATES FOR D.D.R. PART II.

*Radiodiagnosis.*

THE Melbourne Permanent Post-Graduate Committee announces that a series of 27 lectures on radiodiagnosis suitable for candidates for the diploma in diagnostic radiology, Part II, will be held during July, August and September, commencing on July 13, 1949. All lectures, details and dates of which may be obtained from the committee, will be held at 4.30 p.m. The fee for this course is £21.

*Special Pathology.*

Six lectures in special pathology for D.D.R. Part II, supplementary to the general course conducted at the university in general pathology, will be held on Mondays at 4 p.m., commencing on July 11, 1949. The fee for this course is £4 4s., but those who have enrolled for the full D.D.R. pathology course may attend the special lectures without extra charge.

ENROLMENTS.

Enrolments for attendance at any of the above classes should be made with the Secretary of the Post-Graduate Committee, 426 Albert Street, East Melbourne (JM 1547), before commencement.

## Obituary.

REGINALD ATHANASIUS FITZHERBERT.

WE regret to announce the death of Dr. Reginald Athanasius Fitzherbert, which occurred on June 8, 1949, at Drummoyne, New South Wales.

## Nominations and Elections.

THE undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Kellow, Henry Edward, M.B., B.S., 1947 (Univ. Sydney), The Maitland Hospital, West Maitland.

Noake, Bruce Wesley, M.B., B.S., 1948 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

## Australian Medical Board Proceedings.

QUEENSLAND.

THE undermentioned has been registered, pursuant to the provisions of *The Medical Acts, 1939 to 1948*, of Queensland, as a duly qualified medical practitioner:

Horn, David, junior, M.B., Ch.B., 1934 (Univ. Aberdeen), 8 Drayton Road, Toowoomba.

## Research.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION.

HANDBOOK OF AUSTRALIAN SCIENTIFIC AND TECHNICAL SOCIETIES AND INSTITUTIONS.

THE Information Service of the Commonwealth Scientific and Industrial Research Organization is proposing to compile a handbook of Australian research institutions and scientific and technical societies, somewhat on the lines of the wartime publication "Science on Service", which some readers may remember. The handbook will be made available to the scientific public, and will include brief details of the history, location, organization of activities, membership, publications *et cetera* of each institution listed. The information will probably be collected largely by means of *questionnaires*. The Information Service has already compiled a fairly complete list of such organizations, which will be used as a mailing list for the *questionnaires*. As a check, however, it is suggested that secretaries of societies or institutions which would like to be included in the list should write to the Officer-in-Charge, C.S.I.R.O. Information Service, 314 Albert Street, Melbourne, C.2, for a copy of the *questionnaire*, if one is not received by July 30, 1949. A further announcement will be made in this journal when the handbook is published.

## Diary for the Month.

JUNE 28.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 29.—South Australian Branch, B.M.A.: Annual Meeting.
JUNE 30.—New South Wales Branch, B.M.A.: Branch Meeting.
JUNE 30.—South Australian Branch, B.M.A.: Annual Dinner.
JULY 1.—Queensland Branch, B.M.A.: Branch Meeting.
JULY 5.—New South Wales Branch, B.M.A.: Council Quarterly Meeting.
JULY 6.—Victorian Branch, B.M.A.: Branch Meeting.
JULY 6.—Western Australian Branch, B.M.A.: Council Meeting.
JULY 7.—South Australian Branch, B.M.A.: Council Meeting.
JULY 8.—Queensland Branch, B.M.A.: Council Meeting.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

*New South Wales Branch* (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

*Victorian Branch* (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

*Queensland Branch* (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

*South Australian Branch* (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

*Western Australian Branch* (Honorary Secretary, 205 Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

## Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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# THE MEDICAL JOURNAL OF AUSTRALIA



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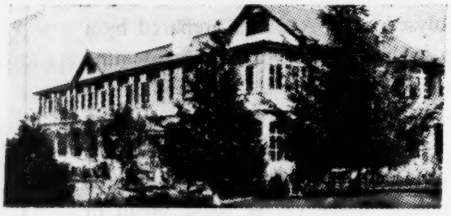

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# THE MEDICAL JOURNAL OF AUSTRALIA

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